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Journal of Forestry

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Multiple Use — Multiple Benefits[1]

Richard E. McArdle
Chief, Forest Service, U. S. Department of Agriculture.

MANY different groups of people use the national forests — people who rightly feel that they have a proprietary interest in these great public properties. Every citizen of this country owns a share of stock in the national forests—one share only, no less and no more. But that one share is immensely valuable. It is becoming more valuable with every passing day.

The national forests are unique public properties—distinctive not only because they encompass 181 million acres of timber and range, jutting mountain peaks, and uncounted lakes and streams, but more particularly because of the management objectives applied in their administration. Most public lands are managed primarily for a single purpose, or in some instances for a dual purpose. The national forests are managed for many purposes.

Today, more than at any other time in the past, this concept of multiple-use management is being challenged. I do not recall seeing the challenge thrown down exactly as I have phrased it. But it can be seen none the less plainly in proposals to dedicate, legislatively or otherwise, large areas to one use or for the benefit of only one group of users. It can be seen in proposals to remove large areas from public ownership so as to benefit primarily one use or one group of users. It is evident in other proposals that would give this or that group exclusive or dominant rights in the use of these public lands.

A development such as this is inevitable in the growth of our country. We need to recognize the existence of this rapidly changing public-land use situation and to be aware of its implications. We need to look as far and as clearly into the future as we possibly can. This is no penny-ante game; the stakes are tremendous.

In the management of the national forests, we of the Forest Service are having to face up to this problem every day, in more places and in more and more different ways. This is particularly true of the western national forests. Here are former hinterlands that only a few years ago were remote and inaccessible. Here are areas whose values have jumped as population has increased, as industrial and agricultural development has leaped ahead, as transportation and communication advances have erased barriers of space and time. The ever-increasing intensity of use of these national-forest lands brings conflicts that at times seem nearly impossible to resolve satisfactorily. Yet resolve them we must, for only by wise balancing of these diverse interests can these public properties be made to yield maximum benefit to all our people.

To help you see this picture more clearly, let me sketch for you some of the multiple uses of the national forests that by leaps and bounds are growing in volume and intensity.

Recreational Use

Take fishing and hunting, for example. More than 2 million hunters and some 4 million fishermen used the national forests last year. We are wholeheartedly in favor of this use of the national forests and want to see it increase.

As a matter of fact, all kinds of recreational uses of the national forests are on the increase. Last year the national forests had 30 million recreational visitors. Ten years ago there were only 10 million. Some of these millions of people want only a place to picnic. Others want to camp overnight. Some want summer homes. A lot of people just want to put a pack on their backs and hike up and down hill. Some want to experience the fascination and deep-seated satisfaction that comes with penetration of a vast wilderness far from sight and sound of civilization. And recently national-forest winter sports use has been increasing at an almost unbelievable rate. The present need for ski runs and lifts and so on is something we failed to foresee a quarter of a century ago. It makes me wonder if today we are seeing future recreational needs accurately —even for only ten or twenty years ahead.

At any rate, with better roads and more of them, with better automobiles and more of them, with a five-day week, longer vacations and more leisure time generally—whatever the reasons may be—more and more and still more people are using the national forests for recreational purposes. That's fine. We like it.

And we are not alone in approving this use of the national forests. Measured in terms of dollars spent, outdoor recreation is one of the biggest businesses in this country. Think of the people who make some or all of their living by selling food and lodging, souvenirs and soft drinks, fishing tackle, golf clubs, gasoline, and a thousand and

[1]Paper presented March 10, 1933, at Eighteenth North American Wildlife Conference, Washington, D. C.

one other items to recreationists. Think of the many others employed in manufacturing these articles or in transporting recreationists here and there or in serving them in countless other ways. The national forests produce a big chunk of this business.

But to me the commercial aspects of national-forest recreation are secondary to the opportunity for people to get away from the mental and emotional strains of present-day living. It is a safety valve which has great significance in keeping people healthy and happy—in helping them to keep a balance and a sense of values in a world increasingly beset with emotional strain. You can't put a dollar sign on this sort of thing, but we believe it is one of the great contributions the national forests make to the people who own them.

Timber Management

Now let's consider for a moment a quite different use of these same lands. More than half a century ago the Congress set forth, as a principal objective in establishing the national forests, the need to furnish "a continuous supply of timber for the use and necessities of citizens of the United States." For a great many years this use, like recreational use, was not very large. Today, as with recreational use, the picture has changed. The amount of timber cut on the national forests has doubled in less than ten years. Receipts from sale of timber were $64 million last year and will be even larger this year.

Harvesting national-forest timber under the sustained-yield principle has helped stabilize communities and local industries and has provided jobs for many thousands of people—not only in the wood-using industries but for butchers, bakers, doctors, lawyers, and merchants serving these industries and their employees. Local governments benefit too because 25 percent of all national-forest receipts go to the states for roads and schools in the counties having national-forest land.

We think this use of the national forests is all to the good. It's good for our country—for all of us. It's wise use of land. It's something that we want to see increase and prosper.

Livestock Grazing

There is still another substantial use of the national forests. Last year permits were issued to about 20,000 ranchers to graze some 3 million sheep and nearly 1¼ million cattle and horses. Grazing fees total about $5 million a year, and this income, too, is shared with the states and counties.

This dollar income, however, does not tell the whole story. Much national-forest range is high-mountain summer range, usable for only part of the year. The home ranches of many livestock owners are at lower elevations with only winter range. We try to work with these stockmen to fit the private and public range together so as to provide the year-around operation required for this industry. We believe that livestock grazing is a proper use of many national-forest areas. Let no one tell you that we want to fence out grazing use of the national forests. By building up the grazing capacity of these ranges through reseeding and good management we can improve their value. We have already demonstrated that this can be done. We want to make this use play an even stronger part in our whole agricultural and industrial economy.

Watershed Protection

There is another use of the national forests which in many respects is more important, more essential, than perhaps any other use. The basic legislation establishing these public forests provided, as a principal reason for their reservation in public ownership, the need to make certain of "favorable conditions of water flows." Our pioneer forefathers knew how important water is. It was the first thing they looked for when they selected a homesite or a place to establish a new community. As time passed, their children and great grandchildren hired other people to worry about their water supplies. It became a job for the superintendent of the city water works, not for the apartment dweller, the individual home or factory owner.

But today, we are again becoming aware—as individual citizens—of our water situation. In the past six months I have been in three cities where water use was temporarily being restricted. I was in another city when the reserve supply of water was sufficient for only a few hours of use. There are towns, both East and West, where further industrial expansion depends on somehow finding an increase in current water supplies. Think of the great distances to which some cities are now reaching out for more adequate supplies of water—distances that only a relatively few years ago would have been considered incredible and probably impossible. These are not things that might happen; these are actualities.

No one knows precisely how much the national forests — and other public lands—are worth to the people of this country as major sources of clean, pure, usable water. I have seen estimates by competent authorities that, at current water prices, add up to hundreds of millions of dollars a year. I know of some national-forest watersheds that for water yield alone are estimated to be worth $2,000 an acre.

Dollar value alone is a poor criterion. Water is something that we must have; it is worth whatever we have to pay to get it. There are other ways to measure the value of this use of the national forests. There are more than 1,800 communities—some are cities of several hundred thousand population—that are dependent on national-forest watersheds for their domestic and industrial water. Thousands more are partly dependent on the national forests. Many—I believe I could say most — of the major irrigated farm developments of the West depend on national forests for their water supplies. More than 600 hydroelectric power developments—including practically all of the major power projects in west-

ern states—depend on water from the national forests.

But valuable as our national forests are today for water production —valuable as these lands are today —it's small compared with the role they are going to play in years to come. If we want water tomorrow we must take care of our watersheds today.

Lands of Many Uses

Perhaps that's enough to show that the national forests are lands of many uses — and many users. The intensity of all these uses is increasing—and increasing rapidly.

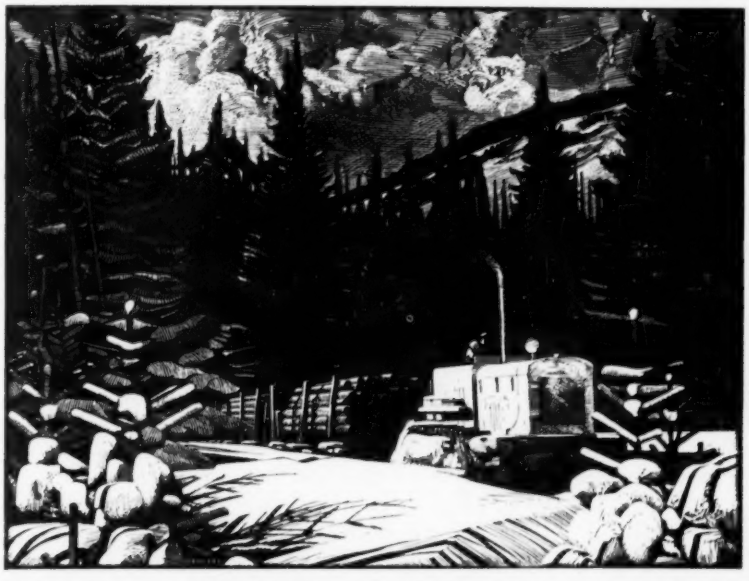
As intensity of use increases we sometimes find one or more of these uses in conflict. It would be more accurate to say that there is conflict between the personal interests of the various groups of users. The wilderness enthusiasts, and there are many of them, naturally want timber cutting and other commercial uses excluded on substantial areas. Timber users object to taking too much commercial-quality timber off the market. The argument, of course, turns on how much is too much. Hunters want more wild game, but the livestock people say that too much big game takes forage away from domestic livestock. Again, we come up against how much is too much? Irrigated land farmers and other water users are beginning to protest vigorously any use of national-forest watersheds that may jeopardize their water supplies.

There are conflicts, too, between surface and subsurface uses. Development of the mineral resources of the national forests is legitimate, proper, and in the public interest. But it should be done with minimum disturbance of surface resources.

It all boils down to this: The practical workability of the multiple-use concept of national-forest administration is being tested on a scale and to an intensity greater than we have ever experienced. The Forest Service believes that many of the diverse uses of the national forests are reasonably compatible. If we had to deal with only one group of users, it would be somewhat easier to agree on a reasonable course of action. But since we must consider the interests of all the people, so also we usually find ourselves in the middle.

Let me make it completely clear that I think being in the middle is exactly where we ought to be. I believe that our inability to satisfy completely each and every group of national-forest users is a definite sign of success in doing the job assigned to us. When each group is somewhat dissatisfied, it is a sign that no one group is getting more than its fair share.

The guiding principle laid down for us nearly fifty years ago still hits the mark. We were instructed to so administer these national forests that they would yield the "most productive use for the permanent good of the whole people, and not for the temporary benefit of individuals or companies;" and "where conflicting interests must be reconciled, the question will always be decided from the standpoint of the greatest good of the greatest number in the long run." That is still the guiding policy of the Forest Service, and I hope it always will be. It expresses the responsibility that we have to protect and build up not only your share of stock in these national forests but that of every one of your 150 million fellow Americans.



Balsam. *From the painting by Charles E. Comfort, commissioned by the Canadian Pulp and Paper Association. One of a series of forest scenes depicting the chief forest species presently harvested by that industry for pulpwood.*

A Postscript on the Lost Identity of Doyle and Scribner

Harold C. Belyea
State University of New York, College of Forestry, Syracuse.

THIS ARTICLE has been inspired by Harris Collingwood's article in the December 1952 issue of the JOURNAL OF FORESTRY entitled "The Lost Identity of Doyle and Scribner." Mr. Collingwood has done a heroic job in digging up the information available to him in Washington, but unfortunately he didn't dig long enough nor in the right direction.[1] For in reality there is a great deal known about J. M. Scribner—where he was born, where he was educated, what he did, when he died, and even where he is buried. In fact, I even have a photograph of him taken about 1880 and obtained through members of his family. Not so much is known about Edward Doyle, but enough to sketch in the main activity of his life and his major claim to fame in the devising and publication of the Doyle Rule.

One of the ironies in the situation is that both the Doyle and the Scribner Rule were devised and first published in the same place, Rochester, N. Y., a city which now seems far removed from lumbering operations and the measuring of the board foot contents of logs. In 1810 when the younger Michaux accompanied DeWitt Clinton into the western wilderness of New York they came to the falls of the Genesee, and he reports in his diary that there was nothing there but "a hole in the wilderness without an inhabitant for miles around." In 1825 that "hole in the wilderness" had become a bustling, little frontier settlement of 3,000 population. In 1835 it was an incorporated town of some 7,000 people and in 1840 its population numbered more than 20,000 persons.

It was one of the most rapidly growing towns of the time. Favored by its water-power site at the falls of the Genesee River, it tapped the rich lands of the Genesee country to the south and stood athwart the main transportation artery east and west—the recently completed Erie Canal—with access to the older settlements to the east and the undeveloped wilderness to the west. In 1825, as later, the main industries of this thriving town were its flour mills and lumber mills. The opening of the Genesee country down to and across the Pennsylvania line produced a big cut of lumber with heavy annual spring log drives.

Edward Doyle

On October 11, 1825, in the U. S. Federal Court of the Northern District of New York at Buffalo, a copyright was granted for the book, *The Improved Reckoner for Timber, Plank, Boards, Saw-Logs, Wages, Board and Interest*, by Edward Doyle of Rochester, N. Y. The first City Directory of Rochester printed in 1827 lists an Edward Doyle living there at that time. A copy is on file in the archives room of the Rush Rhees Memorial Library of the University of Rochester. According to the Roorbach *Bibliothecca Americana* this first edition was printed by D. M. Dewey of Rochester.

No copy of the original edition is known, but copies of the second edition printed in 1837 by Holt and Porter of Rochester, of a third edition printed by J. H. Jennings of Rochester in 1844, and a fourth edition printed by William Alling of Rochester in 1854 have been located. Two of these copies are in the library of a private book collector in Rochester, and the third, a copy of the third edition, is in the library of the University of Illinois. The writer has a photostatic copy of the second edition of Holt and Porter and also a photostatic copy of the Alling edition of 1854. In all three editions cited, which the writer has examined, there is shown the tabulated values of the board-foot contents of logs which we know as the Doyle Rule. The values are for logs 10 to 25 feet in length and for diameters from 12 to 36 inches. The diameter measurement to be used, as stated in the 1837 edition, which is believed to be in agreement with a similar statement in the first edition, is "Inches in Diameter at Small End." This is of some importance, as we shall see later.

Not a great deal is known about Edward Doyle, in spite of a rather exhaustive search through early city and church parish records of the time. One early historical note refers to "Mr. Doyle's qualifications as an accountant." Another local note reports that "Mr. Doyle is a man of superior education who can cypher and keep books."

In the second edition (1834) of the *Improved Pocket Reckoner*, Doyle himself has this preface: "The accuracy of these calculations (*the tables which follow*) can be relied on, as they have been tested in an extensive business for several years, . . ." The second and subsequent editions carried a commendation of the book and a statement of token and esteem from Jonothan Child, the first mayor of Rochester.

From all this we gather that Edward Doyle was a man of some education for the times, but there is no evidence that he was college trained. He seems to have been a man of good position and character in the community. My belief is that he was a trader or merchant, perhaps even a mill owner who accepted logs in kind in trade and devised this log rule to measure their board-foot contents. I doubt that it was he who devised the formula statement as reported by Henry S. Graves in his account of the early history of log rules in the earlier editions of his *Forest Mensuration*, to wit:

> From the diameter of the log in inches, subtract 4 for the slabs. Then multiply the remainder by half of itself and the product by the length of the log in feet and divide the result by 8; the quotient will be the number of square (superficial) feet.

Graves was in error when he said that "the rule was published for

[1] *Editor's note.*—Harris Collingwood sought to encourage the publication of additional information. This article ably presents it.

the first time" in *Elements of Drawing and Mensuration*, by Charles Davies in New York in 1846. As we have seen above, the Doyle Rule as published antedated Davies' publication by 21 years.

In its origin it seems to have been more or less a rule by thumb invented to meet the requirements of average-sized logs which at that time ran 20 to 30 inches top d.i.b. It is not known whether Doyle arrived at his conclusion by observing that 24-inch 16-foot logs usually sawed out about 400 board feet, and that 4 subtracted from 24 and then multiplied by half of itself, and the product by the length in feet, and the result divided by 8 gave 400, and then applied the same technique to all other diameters and lengths. Had he been mathematically trained, he would have at once seen that all this hocus pocus really amounted to squaring, and he would have quickly given it to us in its modern form: $V = \left(\frac{D-4}{4}\right)^2 L$

Doyle as a person and citizen of Rochester seems to have disappeared during the fourth or fifth decade of the eighteen hundreds. The only other record we have of him is the statement of George W. Fisher in the preface of the 1872 edition of Scribner's Lumber and Log Book to the effect that he, Fisher, had "for several years owned the copyright and stereotype plates of 'Doyle's Ready Reckoner'."

John M. Scribner

John Marston Scribner was the son of Samuel Scribner and his wife, Catharine Marston Scribner, and was born at Washington, Orange County, Vt., March 17, 1805. The Scribners go back to early colonial Massachusetts and the Marstons were New Hampshire stock descended from Caleb Marston, an early resident of North Hampton, N. H., in the second and third decades of the seventeen hundreds.

John M. Scribner prepared for college at the old New Paltz (N.Y.) Academy, now a State Teachers' College. In 1830 he entered Union College, Schenectady, N. Y., to train for the ministry. His scholastic record is still preserved there, a copy of which I have before me; he took mathematical subjects all through his college course and attained desirable excellence in them. He was graduated from Union College in 1833 and immediately entered the Theological Seminary at New Brunswick, N. J., from which he graduated in 1836. Records show that in August 1836 he was ordained into the ministry of the Dutch Reformed Church and was inducted into the pastorate of the Old Fort Church at Schoharie, N. Y. The Old Fort Church, now a historical museum, was originally built in 1772, but during the Indian raids and British invasions of the Revolutionary War, because of its massive construction and solid stone walls, was temporarily converted into a fort over the period 1778-1785.

Photograph furnished by H. C. Belyea

FIG. 1.—Rev. John M. Scribner (1805-1880), who in 1846 while living in Rochester, N. Y., first published the Scribner Log Rule. This photograph was taken shortly before his death.

The Reverend John M. Scribner served as the pastor of this church from 1836 to 1839. On January 17, 1837, he was married to Ann Eliza Swart (b. January 21, 1807; d. October 5, 1891) and the first of their five children was born in the Schoharie parsonage. In August 1839 he was called and inducted as the first pastor of newly established First Reformed Church of Walden (Orange County), N. Y., at a salary, as quoted from the early records of the church, "in order to free him from worldly care, of $650 for the first year and $700 yearly thereafter together with use of the parsonage premises." However, the parishioners of the Walden church seem to have been more ambitious in their intentions than in their ability to raise monies to meet their pastor's salary. A perusal of the early minutes of the church governing body seems to indicate some evidence of friction between an unpaid pastor and his delinquent parish. Mr. Scribner being a Vermonter seems to have insisted that an agreement made was an agreement to be carried out, and on the other hand were parishioners suggesting that a minister who was true to his calling ought to be above the worldly considerations of money and salary. It was only after the responsibility of the outstanding obligations were underwritten by two of the more wealthy members of the group that Scribner finally left the Walden parsonage in early November of 1841.

Later in this year, 1841, Scribner moved to Auburn N. Y., where he had been appointed principal and teacher of mathematics at the Auburn Female Seminary. It was while he was at Auburn that he wrote his *Practical Mensuration* as noted by Collingwood in the December JOURNAL. This was a small booklet of forty to fifty pages under the title of *A Practical System of Mensuration of Superfices and Solids*, published by H. & J. C. Ivison, 80 Genesee St., Auburn, N. Y., 1844. A copy of the original[2] edition is in possession of his descendants in Middleburgh, N. Y.

Mr. Scribner stayed at Auburn until 1844 when he moved to Rochester, N. Y., where he seems to have acquired the proprietorship and became principal and mathematics teacher in the St. Paul Street School for Girls. Reference to the Rochester City Directory for 1845-1846 lists a Rev. J. M. Scribner as resident there, and it also lists the

[2] A copy of the second edition of this booklet is in the Library of Congress. It was published by A. V. Blake of New York City in 1844.

St. Paul Street School for Girls without indicating any connection between them. The Rochester venture seems to have lasted only two or three years and the school appears to have folded up in the 1847-1849 depression. By 1850 Mr. Scribner was back in the Schoharie County, his wife's homeland, and there he spent the rest of his days and brought up his family. He spent his time writing, acting as supply preacher, but never again assumed any fixed pastorate. He also entered into business at Middleburgh, N. Y., at which he seems to have had some degree of success. He was at one time or another owner and operator of two paper[3] mill in Schoharie County. He was one of the originators of the Schoharie Valley Railroad and served as a director on the board of that company for many years. He died at Middleburgh, December 20, 1880, after a short illness and is buried in the Old Fort Church Cemetery at Schoharie, N. Y. Roscoe's *History of Schoharie County* states that "he was a thoroughgoing business man possessing the qualities to originate and drive an enterprise to the advantage of the community. He was a terse writer, active and practical thinker, and in his relations with the business world he based every act upon the principles of right and honesty. . . ."

It was in 1846 while living in Rochester that J. M. Scribner first published the log rule which we know as the Scribner Rule. It gave the board-foot contents of logs 12 to 44 inches inside the bark at the top end and for lengths from 10 to 25 feet. Any values for dimensions other than these have been added by[4] authors other than Scribner.

No copies of the original 1846 edition are known, but copies of early reprintings through the late 1840's and early 1850's are in the archives room of the Rush Rhees Memorial Library at the University of Rochester.

There is no record available why J. M. Scribner, an ordained clergyman, and a proprietor and teacher of mathematics in a girls' school, should have concerned himself with things as remote from his immediate affairs as the lumber business and the measuring of the board-footage of logs. Scribner was a man with a trained mathematical mind. Furthermore, according to the records available, his every motive was actuated by his passion for truth and honesty and fair dealing. It is possible that as a young man working in the woods of his father's Vermont farm he had had personal contact with the inequalities of the existent board-foot measurement. It is also possible that with his insistence on mathematical precision in all things he had been irritated to action by the extravagant claims of the accuracy of the Doyle Rule. His solution of the problem was to draw to scale circles representing the top ends of logs and then to draw within these circles to the same scale rectangles representing the ends of as many boards as might be sawed out of these circles, being careful to maintain a proper allowance for slabs and for the saw cuts between the boards. This was an entirely new approach to the problem of devising a log rule, and it commanded widespread attention.

Scribner's Publisher

It is not the part of this paper to set forth the rival claims of the Doyle and Scribner log rules, beyond pointing out that since 1825 a vast number of logs have been scaled by one or the other of them, or by one or the other of their combinations, adaptations, or modifications. Neither author was ever bashful in claiming the superiority of his own log rule over all others.

However, the full story of the Doyle and Scribner rules and of the personalities involved is not ended, nor can it be ended without some reference to their common publisher of the later years, George W. Fisher.

In 1846 when John M. Scribner was an author looking for a publisher he found in George Washington Fisher a publisher looking for an author. The meeting seems to have been both fortuitous and profitable and the two men appear to have entered into a longtime agreement of mutual and exclusive employment of their talents and facilities which lasted twenty-five years. George W. Fisher was born in Dover, Massachusetts, June 29, 1814. He had been brought to Rochester as a boy when his father, an engineer by profession, had been appointed by Governor DeWitt Clinton as superintendent of construction on a section of the Erie Canal. In 1834 young Fisher entered a book selling and book publishing business in Rochester, which within ten years he was able to purchase and run as his own enterprise. In *Scribner's Ready Reckoner*, which was the title of the original publication, he found a "best seller" and many reprintings were made to be sold almost as fast as they could come off the press. According to a statement in the 1870 edition, nearly 500,000 copies had been sold, which was in those times an unprecedented number, and quite outranks all other contemporaries, with the possible exception of Harriet Beecher Stowe's *Uncle Tom's Cabin*.

After Scribner's departure from Rochester, the association between the two men continued apparently without break until the early eighteen seventies. Records in possession of surviving members of J. M. Scribner's family indicate a growing friction between Scribner and Fisher. Just what this trouble was is not stated in the records but from facts we know, a great deal can be surmised.

We know that with Ayling's edi-

[3]Straw paper. According to the Commercial Bulletin of New York and the Paper Trade Journal of Jan. 1, 1875, "straw grown in the Mohawk Valley and its tributaries is held to be of superior quality to all others used in the paper mills of Columbia County of our time. Large quantities are drawn by team from points west of Schenectady." One paper mill of J. M. Scribner was located one mile north of Middleburgh, N. Y. It contained three 250-pound engines and one 54-inch cylinder machine. Its output averaged about 1,800 pounds of paper per day.

[4]One known as the Santa Clara scale was added by scalers of the old Santa Clara Lumber Company of Tupper Lake, N. Y.

tion of 1854, publication of the older Doyle Rule practically ceased, and that for a period of twenty years, through the wide sale of the Scribner book and log rule, the use of the Doyle was almost forgotten. We know further that sometime prior to 1872 Fisher acquired possession of the copyright and stereotype plates of Doyle's *Ready Reckoner*. It is surmized that Fisher either wanted to publish a new edition of Doyle's book, or perhaps wanted to print both rules in Scribner's book, but apparently because of the mutual exclusive employment clause in their agreement could not do so without Scribner's consent. Fisher seems to have had the dominant position by refusing to make any more printings of the Scribner book. Finally, sometime between 1872 and 1875, Scribner sold his copyright and rights of royalty to Fisher for $500 in cash. Characteristically Scribner burned his records and letters from Fisher, so that all that we have here is family memory and tradition.

Then there was accomplished a most remarkable change. Fisher appears to have called to his assistance one Daniel Marsh of Rochester, N. Y., described as a practical engineer. The available records show that there was a Daniel Marsh living in Rochester whose name, as engineer, is associated with several municipal works and improvements of the time. The result of their consultation was a new edition of the Scribner book (1876) under the somewhat more inclusive title of *Scribner's Lumber and Log Book*. There is at least one copy of this 1876 edition in the archives room of the library at the University of Rochester. All the old woodcuts of the *Scribner Reckoner*, all its gems of wisdom and advice to loggers and woodsmen, all its tables of interest, wages, board, and lodging were retained. But there was one great exception —in place of the Scribner Rule for measuring the board feet of logs—there was substituted a tabulated set of values which we at once recognize as the old Doyle Rule, and which had been out of print for more than twenty years.

Furthermore, Fisher and Marsh had the effrontry to publish it over the authorship of J. M. Scribner, M.A. Adding insult to injury, they also retained Scribner's old diagrams and further trespassed both on the credulity and intelligence of their readers by blandly stating that this new rule, the Doyle Rule, was being offered for the first time. So wide had been the circulation and acceptance of the Scribner book that this statement was accepted at its face value and for years the rule was known as the "New Scribner Rule." Oldsters in the lumber business in this state tell me that 60 years ago, when they were boys working in the farm woodlots, the Doyle Rule was in common use under the name of "the New Rule." In 1879 when the Province of Ontario in Canada adopted a new log rule for the measuring of the board foot contents of logs taken from its crown lands and for log purchases on private lands, the enabling act was made to read "to follow the table values of the *new rule* as published in Scribner's Lumber and Log Book, George W. Fisher Publisher, Rochester, N. Y., 1878." The values of this officially established log rule were those of the Doyle Rule.

Fisher and Marsh made some changes. Those of minor importance were where the original Doyle Rule in its calculations always threw fractional values downward to the nearest board foot, Fisher and Marsh raised them upwards. They also extended the rule downwards to take care of 8-foot logs and diameters of 8 and 9 inches, and extended the rule upwards to measure logs up to 40 feet in length and diameters from 45 to 60 inches. They fell into a major error, however, when they substituted diameter measurement at the middle of the log rather than that of the top diameter as originally indicated by Doyle, particularly in their statement for its use:

> It is customary in measuring logs to take the diameter in the middle of the log inside the bark. This is obtained by taking the diameter at each end of the log, adding them together and dividing by 2. It is usual to allow for bark 1/10 to 1/12 part of *the circumference*.

The italics are mine, but mainly to point out that 1/10 to 1/12 of the circumference is an impossible allowance for bark and that, if carried out as stated, the scaler would end up with a smaller diameter than if he had taken the top diameter inside the bark as originally suggested by Doyle, and as is the common custom with this rule at the present time. This error persisted for more than thirty years and even Henry S. Graves, in the original 1903 edition of his Forest Service publication *The Woodsmen's Handbook, Part I*, repeats it as a requirement in applying the Doyle Rule. He also stated it in the earlier editions of his *Forest Mensuration*, a textbook on which many of the older generation of foresters were brought up.

Scribner's Lumber and Log Book enjoyed a wide circulation. The 1895 edition states that more than one and one-half million copies had been sold. It is still being published today and the Doyle Log Rule is still the log rule used.

George W. Fisher died in Rochester February 24 1895. He left his business and his copyrights to his daughter, Miss Sarah E. Fisher, and for many years the book was published over the name of S. E. Fisher. Miss Fisher died in Rochester on September 7, 1940. A Rochester firm of printers who acquired the copyright from her now print the book retaining all of the old woodcuts, advice to loggers and woodsmen, and all of the old tables. The last printing that I know of was in 1944.

A Survey of Forest Genetics Research[1]

Jonathan W. Wright
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Forest-genetics research in the United States is barely 40 years old, but already proved results are ready to put into practice. Tree breeders are optimistic about achieving real genetic improvement in forest trees.

FOREST TREE BREEDING is the practical side of forest genetics—the part aimed at getting improved strains of trees into silviculture. However, a really successful tree-breeding program requires a large background of theoretical information. And this theoretical information is still so lacking that for the present we should concentrate on forest genetics rather than on tree breeding.

Most tree breeders are quite optimistic about the possibilities of achieving real genetic improvement within a reasonable period of time. This optimism is based in part on the few achievements already made but in much larger part upon the record of the crop-plant breeder.

Can we analogize between crop plants and forest trees? Yes, if we recognize and try to take into account the most significant differences. The most important of these differences is the fact that trees are larger and more expensive test organisms than are wheat or corn plants. Observing and measuring 10,000 mature spruce trees is an infinitely harder task than growing 10,000 wheat plants. In this respect trees resemble livestock and we can well borrow testing procedures from the livestock breeder.

The time element is also important, although not in the way usually thought of. There is a fatigue factor of lost records, changing policies, and such, which is much more serious in a 25-year tree generation than in a 1-year corn generation. Aside from this fatigue factor, the fact that it takes us 25 years to rear a generation is not too important. During the period that we are waiting for a new strain we can be working on other strains so that we have a result for the 26th year and another one for the 27th year.

Tree-Race Studies

The first work done in forest genetics was studies of tree races. Plots of Scotch pine of known geographic origin were established in Europe as far back as 1820, and by 1900 several such studies were under way. Almost without exception these tests showed differences in form and growth rate associated with the origin of the seed. Interest in this problem has continued in Europe and we now have a fairly complete picture of the races of the major European species.

By 1910 papers appeared in various of our journals quoting the European results and stressing the need for similar studies here. Soon racial tests were established in ponderosa pine and Douglas-fir. These plantings are now nearly 40 years old and have shown that these species are quite as variable as the European species. During the 1920's and 30's few new racial studies were started and we now have only fragmentary data on races in our native species.

This situation is now being remedied. Since the last war several agencies have initiated geographic-origin studies in our more important species—especially in the pines.

Even more important from the practical standpoint is the fact that during the past 10 years practicing foresters have become conscious of the dangers of planting seed of unknown origin and most agencies doing much planting are making every effort to get the best seed available.

From the geographic-origin tests already made we can make the following generalizations:

1. Most widespread species consist of a number of races differing from each other in such diverse characters as growth rate, leaf color, or winter-hardiness.

2. The patterns of racial differentiation are similar but not identical for two species occupying the same general range.

3. In general, the races from regions whose climates and soils favor rapid growth, good form, or a high degree of cold resistance exhibit these same characters when grown in comparison with other races under uniform conditions.

4. With regard to all characters, the local races are usually best for planting, although exceptions to this rule may be expected in every species.

Most of our racial studies have been too empirical. They have not included tests of the effects of such important factors as isolation, geological history, and mutation rate on race formation. Fortunately there is now a large literature on the evolution of races and species of animals and smaller plants. This literature, if read, can help us with the theoretical aspects of many forest-tree problems, and help us get the most out of future racial studies.

Crosses Between Species

Historically, interspecific hybridization is the second major field of interest in forest genetics. Work was started about 1925 in both poplar and pine. It has centered largely in the United States and Canada, probably because the phenomenal success of hybrid corn in these countries has stimulated interest here in all type of F_1 hybrids.

The initial few years' work in the poplars showed that nearly all species cross readily and that several combinations give hybrid vigor. Recently the interspecific hybridization work has been augmented by selection work within

[1]Presented at S.A.F.C.I.F. meeting, Montreal, Canada, Nov., 1952.

species. A considerable number of the poplar hybrids have been tested long enough to warrant their planting on a large scale in some sections of the Northeast.

The interspecific hybridization work in pines has followed a quite different pattern. It was early found that most species would not cross with each other, and a large portion of the first 25 years' work has been spent in building up a table of crossing relationships within the species.

This table is now fairly complete for the important species that will grow here. In the past few years we've been able to use portions of this table and to concentrate on those relatively few crosses that have the greatest likelihood of taking. In California a few of the hybrid combinations with outstanding growth properties have been mass produced on a pilot scale. In ease of planting and the young age at which many species flower, the pines have proved more convenient test organisms than the poplars, although they are more difficult to cross and to root from cuttings.

The successes in the pine and poplar work have led us to try interspecific hybridizing in other genera. In most cases the crossability pattern found is similar to that in the pines: crosses between closely related species usually take readily and often exhibit hybrid vigor, whereas crosses between unrelated species do not take.

This is fine in the birches and spruces, for in these genera there are many crossable species-pairs, both members of which are good timber types. But in the maples and ashes very few of the easily made crosses involve two good types. For example, each of our most important maple species—sugar, red, Norway, bigleaf, and boxelder—is so distantly related to the others that there is little possibility of gene interchange in this group.

In the early years of the interspecific hybridization work many crosses were attempted between distantly related species in the hope that very rare but spectacular hybrids could be rooted easily. Large-scale rooting has proved difficult, and emphasis has gradually switched to mass production of F_1's, F_2's, and back-crosses from seed.

Crossing Within Species

The third major line of work is selection and crossing within species. Most of this work has been started only within the past decade. The impetus has come primarily from Europe, and it is only since the war that there has been an active interest in selection in North America.

There are four steps involved in a selection program within species:

1. Choosing trees in the forest that seem to be genetically superior.
2. Testing the genetic content of these trees by growing grafted or rooted progeny under uniform conditions.
3. Testing the combining ability of these various superior trees to determine which particular combinations give superior offspring. This is a fact frequently lost sight of by foresters who assume that the performance of the offspring always closely follows that of the parent.
4. Finding ways of mass producing successful combinations by interplanting selected clones in seed orchards.

Few tree breeders feel confident of their ability to recognize superior genotypes in the forest without a large error, or to recognize trees with superior combining abilities without an even larger error. For this reason many of the small selection programs limited to the first step—choosing the select trees—are doomed to failure. Only with an adequate carry through of clonal testing and controlled pollination work can success be assured. Fortunately most—but not all—of the larger programs do contemplate this carry through.

To be really successful, the selection work should be tackled on a fairly large scale, and should be concentrated on one or two characters at a time. To show why this is so, I can cite the Wisconsin work on blister-rust-resistant white pine. From several thousand wild trees, 163 rust-free trees were chosen. Grafting experiments showed that about three-fourths of these were merely escapes, leaving about 50 genetically superior clones to work with. Some of these don't fruit well, and we suspect that there may be only a dozen or so that combine well enough with each other to give satisfactory rust-resistance in the offspring.

If the original selections had been made on a small scale we might merely have proved the existence of rust resistance in the native species and not have enough material on which to base resistant varieties. Or, if we had tried to find 40 rust-resistant, weevil-resistant, and fine-branched trees, we should have failed. Therefore it seems best to work on these other desired characters separately and at a later date to combine two or more desired characters into one strain by crossing.

European experience with oak shows what we may expect from a selection program in trees. Over several centuries Dutch foresters have selected the straightest roadside trees as parents and have built up a strain of "Dutch oak" that is recognized as superior in form to the wild types in several north European countries.

Beside selecting the best trees already in the forest and trying to fix the desirable characters, there are two other ways in which we may improve species by working within species. So far we have shied away from several generations of selfing and later outcrossing as in corn because of the time element. But recent developments on self-compatibility, inbreeding depression (or lack of it), and induced fruiting indicate that inbreeding started now could lead to very useful results within the next half century . Several tree breeders are carrying along selfed lines for their successors. Also we can get hybrid vigor right now by crossing known races of trees. German-made interracial crosses in Scotch pine have exhibited hybrid vigor and prompted several of us in the United States and Canada to pursue this line.

The Most Promising Approach

Which is the most promising of the three lines of attack? This depends on the group we are working with.

As yet we have no interspecific hybrids involving red pine. But we know that within that species there are important racial differences and probably individual tree differences useful in a selection program.

In the paper birches the taxonomy is so complex that we can't as yet separate races from species, so must perform the racial tests and the species crosses at the same time. Too, there seems to be tremendous variability within races of the birches.

In the closed-cone pines of California (a group including Monterey pine) the species are small and fairly uniform, but cross rather readily. In these we tackle the interspecific crosses first.

We can get remarkable hybrid vigor from one interspecific cross involving certain parent trees of boxelder. But we can get the same vigor within the species by using other boxelder parents. Hence here we can most profitably combine selection and interspecific hybridization in that order.

Practical Applications

In discussing the immediate practical applications of forest genetics it should be pointed out that trees are difficult genetic material. The oldest forest—genetics work in our country dates back only 40 years, and most of the intensive work is less than 15 years old. But we don't need to apologize for lack of results. We can be proud that we already have some proved results that are ready to be put into practice.

Seed Source

The information gained from the various racial studies is already being put to good use by many agencies. But there are still many small to medium-sized planting programs in which no thought is given to seed source and in which future growth may be cut by 25 to 50 percent because the wrong seed was used.

At present the best we can do is to recommend the use of local seed (or, in the case of Douglas-fir, certain non-local races for certain localities, and to define the "local" race in very general and cautious terms. In the case of exotics we can recommend the collection of seed from local successful plantations or in some cases from certain areas in Europ or Asia.

Reproductive Habits

In the course of their work, tree breeders gather a great deal of information on the reproductive habits of trees—particularly on the effects of pollination on seed set and on the periodicity of flowering and fruiting of individual trees.

A surprising amount of this information is of direct practical application in present day silviculture. As an example, eastern white pine in eastern Pennsylvania cones well long before it pollinates heavily. Consequently, seed sets per cone are unexpectedly low.

In reproducing this species, increasing the pollination potential is fully as important as bettering the seedbed. Too, current experiments on artificial stimulation of fruiting should be fully as important to the silviculturist as to the tree breeder.

Use of Exotics

Getting exotics into increased use is the third immediate practical application of forest genetics. You may wonder why this is regarded as a contribution of forest genetics rather than silviculture. It is simply that the tree breeder is in closer association with exotics than are most foresters and is in the best position to evaluate them.

There is a small group of exotics that deserve special attention. These are the monotypic or nearly monotypic genera from eastern Asia, such as the ginkgo, Katsura-tree, Cunninghamia, Crytomeria, and the newly discovered Metasequoia.

These have no living close relatives that are hosts to insects or diseases that are likely to become epidemic when transferred to another species. Hence they have as a group remained quite pest-free in this country and we believe they will remain so. Each of them has wood and growth properties that would make it valuable in those areas to which it is climatically adapted. And each has been tested sufficiently in arboreta and parks that there seems little risk involved in putting out medium-sized plantings in certain sections along the eastern seaboard.

Norway spruce, Scotch pine, and European and Japanese larches in southern Canada and northern United States; deodar cedar in California; and Norway maple and European sweet cherry in the Middle Atlantic States have also proved themselves in small or medium-sized tests. They give every indication of being able to fill definite ecological and commercial niches, and can be safely used now.

Much of the prejudice against exotics is due to the haphazard way in which they have been tested—planting them on the wrong site, in the wrong region, or from the wrong seed. Plantations made with full attention to these matters should remove this prejudice.

Uniform Experimental Stock

The fourth way in which forest genetics can contribute to everyday forestry is in supplying uniform stock for experimental purposes. The chemist may strive for months to obtain uniform material with which to start an experiment. Once he has obtained it he makes every effort to make all parts of the experiment reproducible.

On the other hand, the forester is blessed with uniform material to start with—in the form of clones, single-tree progenies, moderately uniform races, etc.—and he makes every effort to render it non-uniform by mixing races or even species, by not keeping track of the seed source, and by not controlling as many of the environmental factors as he reasonably could.

Improved Strains

Even though furnishing improved strains for forest planting

is the principal objective of the tree breeder I put it fifth at present. Too short a time has elapsed for us to make great contributions in this respect. We hope that the following few examples are but a small percentage of those that will come about in the next two or three decades.

In black locust there are now selected strains that are frequently available in moderate quantity from certain nurseries. Although these strains are not thoroughly tested, they do seem to be definitely superior to the wild type in form and are definitely worth planting.

For the northeastern United States there are certain mixtures of hybrid-poplar clones that have been tested long enough that they could be released for general planting. There are a few bugs remaining, but these are mainly in the ecology and planting methods rather than in the genetic quality of the material.

Several nut-tree nurseries now offer selections of Chinese and hybrid Chinese-American chestnuts for sale. These can be regarded as very acceptable nut producers to replace the American chestnut, although more improvement is needed before we have a timber-type chestnut suitable for large-scale planting.

Some of the pine hybrids produced in California are nearly ready for practical reforestation uses. There remain a few problems in the mass production techniques, yet even now some of these hybrids can be produced cheaply enough and show enough superiority to justify their use on a moderate scale.

In all the above examples, testing is nowhere near complete, and the improved strains are known to perform well on only a small portion of the sites to which they may ultimately prove adapted. Hence the first practical trials should be limited.

Among the improved varieties, there are two that are only probabilities at present but should be coming in the next 15 to 20 years. The first is a blister-rust-resistant, heterotic white pine hybrid. The rust resistance and the heterosis have already been proved. Work is now progressing on the inheritance of the rust resistance, on methods of mass producing the hybrids, and on testing the progeny under a variety of conditions.

The other is the first-generation hybrid between Japanese and European larch. The cross has hybrid vigor under European conditions and is very easily made. For this particular hybrid the problems of mass production and of testing seem so simple that we might well get into large-scale production within the next decade.

Prompt Payment of Dues Urged

On April 1st a second dues memorandum was mailed to those members who have not paid their 1953 dues. Prompt payment will help to reduce for the year per member costs.

June 30th is the deadline for payment of 1953 Society dues. After that date members, whose dues are not paid, are declared to be in bad standing, do not receive the JOURNAL OF FORESTRY, and cannot vote until dues are paid.

Former members, dropped for nonpayment of dues, (1950 and subsequently) may be reinstated upon application by payment of back dues not to exceed those for one-half year, plus current dues. Members dropped prior to 1950 must pay back dues for an entire year.

Public Relations and the Forester[1]

Fred L. Palmer
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PUBLIC RELATIONS is the function of taking public opinions into account and dealing with them as a force.

I want to place emphasis on the fact that public relations is a response to a force—public opinion—affecting the activities of individuals, companies, industries, professions and institutions generally. It must be obvious that if public opinions do not affect you as individuals, or as a profession, you have no public relations functions. By the same token, if public opinions do affect you as individuals and as a professional group, then you must study how to deal with public opinions. You must think in public relations terms.

I assume that none of you would argue that public opinions do not affect foresters or forestry. As a matter of fact it seems to me that they are constantly a major influence on you and on your work. I assume, for example:

That public opinions affect budgets—the amounts of money available for various forestry projects, whether you work for government or private industry. There are always popular and unpopular expenditures.

I assume that public opinions affect the cooperation you get from important groups—farmers, for example.

I assume that public opinions affect legislation and taxing policies of interest and importance to you; that public opinion affects fire protection, cutting policies and practices, government-industry cooperation. Public opinion must affect the extent to which young men are drawn into forestry (or lost to some other field)—the extent to which universities can and do offer effective courses in forestry.

From what I know of forestry problems—which, I admit, is not much — there are enough public opinion problems at enough levels and in a sufficiently diverse assortment of sizes so that all of you can legitimately consider not only some of the larger over-all problems of public opinions but many specific local and special problems which you can deal with as individuals.

Guiding Principles

If you are going to deal with public opinions you will need at least a few rules to guide you. I would like to start off with a piece of profound wisdom which summarizes in a capsule the first lesson to be learned in dealing with public opinions. It should be the keystone of your arch. Arnold Bennett, the British novelist once remarked:

"A young man trying to give a good impression gives the impression of a young man trying to give a good impression."

In my estimation there is no more important public relations lesson to learn. It says that people tend to look like what they are—and they seem to be up to exactly what they are up to. I urge you to digest this primary truth very thoroughly.

Now let's ask what it is we want from public relations. What is it your profession should want? What should each of you want as you go about your work?

I think in order to operate economically, effectively and with a minimum of social friction, you—like companies and industries—need (1) Public confidence in yourselves as a group and as individuals; and (2) Public understanding of what specific things you are trying to accomplish at any given moment.

If, as individuals and as a profession, you try to work in a climate of distrust — where people think you are not working in the public interest—or believe you have neither vision, conscience, nor enterprise—then you will have a difficult time. You need a climate of public confidence, as individuals and as a profession, if you are to do your work and do it well.

But, granting you have a general climate of public confidence, then people must also know what, at a given moment, you are trying to accomplish. What are your aims? What are your goals? What are you up to?

There are a number of truths which deserve your attention. I offer four:

1. *People are much more interested in ends than in means.* They will not be at all interested in any means until they have seen the vision of the objective. If you want public confidence and understanding, be sure to establish and keep re-asserting your objectives. When you have identified yourself with a fine objective you are a long way toward convincing people that you can be trusted to supply the wise means.

2. *People are interested in their needs, not yours.* You cannot think only in selfish terms and enlist very many followers.

3. *People are attracted to men moving toward positive, hopeful, forward-looking programs.* They are not inspired by negative, defensive, backward-looking programs. It is a question whether political parties are ever defeated by the negative counsels of the opposition—whether they don't defeat themselves by losing their clearly-defined positive, forward-looking plans for a better tomorrow.

4. *If you want people to follow, you must act.* You must have a plan or a program and you must be acting on it. Leadership is not achieved by talk alone, no matter how grand. You must have beliefs, and you must be acting on them. Once you get in motion, fighting for something that seems to you worthy of your blood and sweat and tears people will probably start joining you. But don't expect them to follow where you are not leading.

As a first quick summary — whether you are thinking as individuals or as a profession—you must: (1) have a positive, forward-

[1]Presented at S.A.F.-C.I.F. meeting, Montreal, Canada, Nov. 1952.

looking, hopeful objective which is clear to you and clearly in the public interests; (2) start acting to achieve that objective.

Gaining Public Attention

One of the most difficult problems when dealing with public opinions is to get public attention. There is at all times a tremendous competition for the eyes and ears of people. You may think that conservation, or good forest management, or some aspects of these subjects are of such vital interest that no man or woman in Canada or the United States can ignore them and still be a good citizen. It so happens there are other ardent advocates of other causes who can just as vigorously insist that foresters should know far more than they do about juvenile delinquency, capitalism, the aluminum industry or a thousand other matters.

Obviously no one could possibly know all he "must" know about all topics. Obviously there is tremendous competition for public attention. How in the world, then, are you ever going to get sufficient attention locally or nationally to win public confidence and support?

The surest way to gain public attention is to be working for objectives dear to the hearts and close to the needs of many people. Trotsky was asked how it was that the Bolsheviks with such weak forces, so few printings of literature, were able to impress their ideas and slogans on the people so successfully. "The answer to the enigma is very simple," he said. "The slogans which correspond to the acute need of a class and epoch, themselves create thousands of channels for their own dissemination."

If you were in the United States during the recent World Series you would have seen a proof of this. Every elevator operator in New York was broadcasting the scores. Every waiter in a restaurant would give you scores — unasked — with every course. Every time a train stopped at a station someone would come aboard with the latest score.

Two other case histories bear on this highly important point.

You may not remember that General Marshall, when Secretary of State, never offered the world a "Marshall Plan" at all. During a talk at Harvard on June 5, 1947, he outlined the principles on which any intelligent handling of the European situation must, in his opinion, be developed. As a matter of fact, the morning of the same day President Truman blasted the Russians at an unscheduled press conference and took all the headlines of the day. He would not have done so if he and General Marshall had wanted to gain attention for some plan. Furthermore astute news editors did not recognize a "plan" in the speech. The *New York Times*, for example, said: "Marshall Pleads for European Unity."

But General Marshall — unbeknownst to himself and others — had nevertheless voiced a point of view that seemed to millions of people to represent an understandable approach to the European problem. His views captured public imagination. They "created their own channels of dissemination." In the end the State Department was forced to produce what people began to call the Marshall Plan.

In September of that same year —1947—the American Association for the United Nations and the United Nations Association of Cincinnati in cooperation with the Stephen H. Wilder Foundation launched a six months' crusade to make Cincinnati "United Nations conscious." They set out to show "how a community may be so intelligently informed on world affairs as to be a dynamic force in the creation of an ordered and eventually a peaceful world."

A community-wide campaign of information was begun and maintained for six solid months. Some 13,000 people were reached directly through the Parent-Teachers Association which devoted programs to the topic of world understanding. Every school child in the city was given literature. School teachers kept the subject constantly before them. The school teachers received quantities of materials for their own use. Fourteen thousand children in the weekday church schools held a World Community Day program. One hundred and fifty leaders in the Cincinnati Council of Church Women took training courses in how to plan United Nations Programs. Ten thousand members of the Catholic Parent-Teachers Association were exhorted by their Archbishop to support the United Nations. A group of clubwomen sent 1,000 letters and 1,350 telegrams pledging their support to the American delegation. All local broadcasting stations broadcast facts about the United Nations, and one of them scheduled spot broadcasts 150 times a week. Local newspapers played up the United Nations in news and features throughout the whole six months' period. In the last three months 225 meetings were serviced with literature and speakers. Hundreds of documentary films were shown. The slogan "Peace Begins with the United Nations — the United Nations Begins With You" was exhibited everywhere—on blotters, in streetcars, on matchbooks, everywhere.

There were many interesting results. For example:

At the end of six months only half as many people considered the United Nations a means of preventing war as thought so at the beginning. There was almost no change in the number who thought the United States should take an active part in world affairs. At the beginning 76 percent of the people thought the United States should join in a movement to set up an international police force and at the end 73 percent.

Public Absorption of Material

But the result I draw especially to your attention is this:

There was almost no change in the number of people who knew what the main purpose of the United Nations was; almost no change in the percentage of people who had heard of the veto power; and no change in the small percentage who could tell how it works.

It is easy for us to equate mass distribution of materials — with mass absorption of that data. It is not necessarily a safe question.

Water does run off a duck's back. People do refuse to notice or absorb information that does not interest them. It is a common observation among students of the subject that people tend to read the newspapers, magazines, articles and books which seem to them to be discussing and confirming what they want to hear. They do not readily listen to the opposition.

This, you will recognize, presents you with a difficult challenge. I think it re-emphasizes the importance of these essentials of a public relations program:

1. You must solve your own problems while solving the problems of others.

2. You must have a positive, forward-looking, hopeful, progressive program.

3. You must emphasize objectives —ends, not means.

Forestry and Public Opinion

I have a feeling that you who are foresters have a great opportunity — with widening horizons before you. Increasingly you must face problems involving public opinion and develop public relations solutions, locally and on national and international scales.

As populations have grown, the need for producing more wood has increased in importance. This opens up the whole great educational problem of teaching more people to become tree farmers and creating conditions that will encourage such a result. Public opinion is a matter of prime importance in this area.

As wood use has expanded, people have become more conscious of the limitations on supply. As they see nations like the United States turn from an exporting to an importing nation with respect to many resources — metals, for example, and petroleum—they become conservation minded. I think history has shown that only through use can we expect to develop our resources and substitutes for resources—but many people fall naturally into the opinion that the way to save resources is never to use them. Who will take leadership in such a situation where public policy must be formed?

As population grows, and use expands, we find people rising to defend the wildlife of the country against real or imagined threats—and often proposing unreal and unreasonable solutions. Here surely is a problem in public opinion and, therefore, public relations.

As wood consumption mounts, the cost of the failure to solve the problems of fire and insects becomes more evident. This is in large part a public opinion problem. It is also potentially a great cause in which foresters can enlist themselves and gain both public confidence and understanding.

In the forests of the United States and Canada there are many local problems of importance which can be solved only by dealing with public opinions and developing programs that take into account the real needs of the people. There is, I find, very little published or private evidence that anyone is examining forest community problems with the insights of the sociologist.

In some parts of the world the forester finds himself confronted by competition for land and labor with the mining engineer or the petroleum geologist. Very often the forests suffer. Very often the solution to such a problem may go the wrong way because no one speaks up for the forests in a voice that can be heard.

It has been my observation that many government foresters misjudge industrial foresters — and vice versa. There is room for more understanding in place of misunderstanding. The job to be done is big enough so that no one group can do it—and both groups need to see it done.

There are many places where old public opinions may be blocking developments which are inevitable and in the public interest. Some people think the Adirondack forests is one. A relatively small number of deeply-interested people—supported by the much greater number of people who really are inert but can easily be aroused by cries of "Conservation!" and "Defend the virgin forests!"—hold the field. Perhaps this is not for the best interests of New York State or the nation.

The whole broad area of wood harvesting is a rich area for anyone interested in public relations. To some people the destruction of a single tree is a tragedy. The cutting of great numbers of trees—even when the work is done in such a way as to insure a lush regrowth —is a multiple tragedy. Clear cutting often seems to be ruthlessness personified. Yet foresters can defend it as good forest management.

I feel sure you have public opinion problems in the field of ground water maintenance and floods.

I think all foresters should recognize that forestry men as a group—whether they are in industry, in government, in universities or wherever—will be greatly aided if people generally have confidence in forestry as a profession. That means you must be openly and vigorously fighting for the forests in the public interests whether you are private or public foresters. Unless your profession has defined high and clear objectives for itself and has a strong crusading spirit, the name "forester" will have limited value as an asset.

I think you should all want to see that your professional groups are enlisted in great purposes. It will help each one of you in his own backyard, wherever that may be.

Summary

Every forester has a job to do in some local area. Here I believe he should survey his area and his problem in terms like these:

1. What groups of people have an interest in some aspect of my forest problem locally? These are the "publics" he should first examine carefully. These are the people who already have an interest in forests which may be harnessed—or it can work against the forester.

2. Are you sure you understand the objectives of these groups? If what you want to do helps them to do what they want to do, you have a great advantage.

3. Who are the people who speak

for the community? Who help it shape its viewpoint on matters of public policy? These are the people who should first learn the objectives of any local programs and fully understand it. They are the ones who will in the end speak for you or against you.

4. Have you clearly defined your aims? Try to state clearly what it is you want to accomplish — the ends, not the means.

It seems to me doubtful whether any other group of men will find more public opinion problems to deal with during the decades ahead of us in Canada and the United States than the forestry profession.

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Reseeding Sagebrush Rangeland in Nevada

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Sagebrush, at first glance, may appear to grow where no other plants can survive.

Actually the reverse is true, for a good stand of this shrub is one of the best signs of the presence of soil fertility and moisture. Early settlers in Nevada and elsewhere throughout the West often used height and vigor of sagebrush as a guide to soil quality and to point out where to clear land for cultivation.

Its usefulness in this respect is no less important today. There are, literally, millions of acres of sagebrush rangeland in Nevada. Of this it has been estimated that on no less than seven million acres the abundance of sagebrush indicates sites fully capable of producing forage grasses.

As valuable as sagebrush may be for pointing out good sites, it is, unfortunately, very poor range feed. Further, presence of large plants in dense stands almost entirely eliminates forage plants. It is therefore necessary to remove sagebrush before range reseeding can be successful.

Technicians of the Intermountain Forest and Range Experiment Station have carried on reseeding experiments throughout Nevada since 1939. For the sagebrush type, work has centered on three main lines: methods of clearing sagebrush, how and when to plant, and species trials.

Land Clearing Prior to Reseeding

Results of experiments show several effective methods of removing sagebrush. The wheatland disk plow has been used for many years for clearing level or rolling areas free of rock. Kills of sagebrush from this sturdy, rigid implement average from 60 to 80 percent. Recently a more flexible type of disk, called the brushland plow, has been developed by the Forest Service. It was patterned after the Australian stump-jump plow. The disks are mounted in pairs, each pair independently sprung, so that rocks and other obstructions do not throw the entire plow out of the ground. Brush kills of this plow average from 80 to 90 percent, even on areas too rocky for use of wheatland type plows. Plowing should be done in the summer before sagebrush seeds mature and in order to give the soil time for settling before seeding.

Controlled burning is another effective way to remove sagebrush. However, before starting a fire, control lines should be constructed and a fire permit obtained; during the fire enough men should be present to maintain control, and after the fire, reseeding should be done as soon as possible. (For complete information on elimination of sagebrush by fire, see "Sagebrush

Fig. 1.—Reseeded area near Paradise Valley in Humboldt County, Nevada. *L.*—In 1946 the stand of sagebrush was reduced by plowing with a wheatland disk plow and the area seeded to crested wheatgrass. Before the operation this range yielded a cow month of grazing for every 25 acres. *R.*—By 1948 the excellent stand of crested wheatgrass was producing a large amount of succulent feed each year. This field produced an average of 705 pounds per acre in the years following, weight on an air-dry basis. Moderately grazed, the reseeded range has been improved and the carrying capacity increased from 8 to 10 times.

Photos U. S. Forest Service.

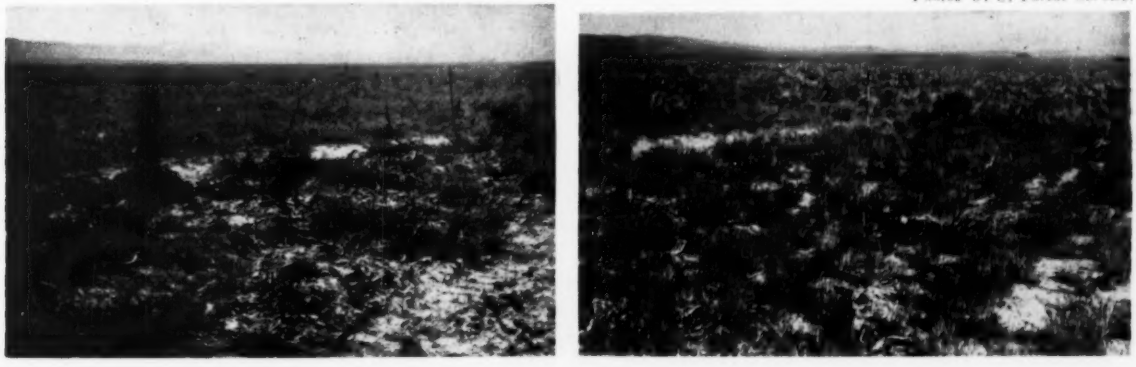

Photo U. S. Forest Service.

FIG. 2.—Seed production planting at John U. Birnie's ranch in Paradise Valley. Intermediate wheatgrass seed is here raised primarily for use in Nevada. Planted in the spring of 1949 and irrigated twice each summer, the wheatgrass stand produces an estimated seed crop of 500 pounds per acre per year.

Burning—Good and Bad," USDA Farmers' Bulletin No. 1948.)

On rocky, uneven sites, such implements as the self-clearing harrow and the rail drag have been found useful. Ordinarily the proportion of brush killed is low (40 to 60 percent) for these implements, and they are recommended only for sites where other machinery or methods are not practical.

Removal of sagebrush is only half the story. Areas having only a few scattered grasses and weeds under the sagebrush before clearing cannot be expected to burst forth with forage plants. The other half of the story, then, is careful seeding of adapted forage plants.

How, When, and What to Plant

A large number of species have been tried in reseeding experiments in a variety of conditions that are found in Nevada sagebrush lands. Crested wheatgrass has been more successful than any other species. Other outstanding wheatgrasses, such as intermediate, pubescent (stiffhair), and tall, give ranchers a wider selection for reseeding now that seed has become commercially available.

Much of the sagebrush land in Nevada lies in the rainfall belt of 8 to 13 inches per year. Under such conditions, crested wheatgrass is generally recommended for seeding, once the sagebrush is removed. This is a deep-rooted perennial bunchgrass introduced into the United States about 45 years ago from Siberia. It is hardy and long-lived, and has produced excellent stands on almost any type of well-drained soil, ranging from clays to sands. Crested wheatgrass begins growth early in the spring and furnishes abundant feed when grazed from late spring to early summer. After that time it matures and becomes dry and harsh. Plants green up after fall rains commence and produce forage in the fall as long as temperatures are favorable for plant growth.

Seed must be covered if a satisfactory stand is to develop. By far the most dependable method of seeding range land is through the use of the ordinary grain drill. Drills make it possible to get the proper amount of seed planted at the right depth for germination. Broadcasting of seed directly ahead or behind plows, harrows, or rails has also given good results. Where these implements are adapted they can perform two operations—seeding, and eradication of the brush—at one time. Seeding by any method is ordinarily best done in the fall of the year.

If drills are used, about five to eight pounds of seed an acre are required. The depth of drilling should be about one-half inch on heavy clay soils to an inch on lighter sandy soils. If the seed is broadcast, the rate should be increased to eight to ten pounds per acre.

Once seed has been planted, the area should be protected from grazing for at least two years. Crested wheatgrass is a rather slow starter and requires time for establishment. If, when grazing begins, a sound management plan is set in operation, crested wheatgrass will be a faithful producer of forage through the years.

Photo U. S. Forest Service.

FIG. 3.—Cattle are grazing contentedly on this three-year old reseeded pasture in northern Nevada's Santa Rosa Mountains. Crested wheatgrass and smooth broomgrass were drilled directly into the soil after a controlled burn had made a clean sweep of the sagebrush.

Photo U. S. Forest Service.

FIG. 4—Developed by the Forest Service, the brushland plow is currently used in brush eradication prior to reseeding range lands. The main feature of the plow is the arrangement of disks in pairs, each pair mounted on a spring system that allows rapid self-adjustment over rocky and uneven terrain. Area shown is Back Ridge Basin in the Santa Rosa Mountains where the plow was used to prepare 1,000 acres for reseeding purposes.

Summary

The present outlook for Nevada is very promising for converting large areas of low-value sagebrush into grassland ranges. Reseeding will aid immeasurably in increasing the production of meat. Crested wheatgrass is generally recommended. To be successful, reseeding must be carefully planned, and follow these essential steps: (1) A thorough eradication of sagebrush, (2) careful planting at the proper season and at the proper depth, and (3) continuing wise management.

Porcupine Feeding on Ponderosa Pine in Central Idaho

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THE PORCUPINE (*Erethizon epixanthum*) is found throughout central Idaho and is a considerable forest pest, but little is known of its ecology there. Porcupines can be found in timber types between 4,000 and 6,000 feet in elevation the year round and in the desert valleys many miles from timber in midsummer, which appears to be a contradiction of their accepted seasonal movements (*4*). The fact is that their local populations and the extent of their rovings throughout each year are little understood. No direct control is exercised over them and their chief predators, the fisher, bobcat, cougar, and great horned owl are noticeably scarce.

The belief that the porcupine is protected as a source of food for lost woodsmen is a myth still shared, oddly enough, by some foresters and wildlife men. This mammal has never been protected in any state of the Union or province of Canada and probably never will be. Indeed, a bounty is often paid in some sections of the country, in an organized attempt to control their numbers but has proved to be an ineffectual measure.

Since the animal is found throughout the continent except in the southern United States and on Prince Edward Island, it is natural to expect that most forests of this country and Canada provide a winter food source for them. In central Idaho this seasonal diet consists largely of ponderosa and lodgepole pine poles. Some disfigurement of trees through feeding can be expected but, it is more important to determine whether, beyond this, the stand has become understocked, or if crop trees and those to be taken out in late thinnings as saw timber have been measurably devaluated as a result of porcupine feeding.

In order to avoid exaggeration of the seriousness of porcupine feeding, representative samples from the different age classes of forest types and plantations must be examined carefully and analyzed objectively (*1*).

It is well to bear in mind the remarks of Taylor (*8*) that "Ordinarily it is impracticable, even for an experienced observer, to estimate fairly the amount and seriousness of porcupine work in a forest of varying character by simply travelling through it." He states further that "It should also be emphasized that 'damage' by the porcupine, as recorded by the observers and by the author, is of very different degrees of seriousness, both as regards size and location of trees affected."

In virgin and once-cut stands of ponderosa pine there is usually a preponderance of the larger diameters, a dearth of intermediate sizes, a fair representation of poles, and a small number of seedlings and saplings per acre. In all virgin forests, ponderosa pine is generally found in groups of these age classes and with ample evidence of past fires. While pole-sized trees occur occasionally as scattered single individuals they are found commonly in groups varying in size from 0.10 to 1.0 acre and usually of sufficiently high density to prompt some development of dead length and early development of crown classes. There is more feeding in the pole-sized class than in any other, perhaps because of minimum effort required in climbing to tender bark, facility of feeding, satisfactory concealment, and unlikelihood of disturbance. This investigation is confined to the results of feeding on poles (3.6 inches to 10.9 inches d.b.h.) in a virgin stand cut some 15 years before the data were collected during the remeasurement of plots in a harvest cutting study on the Boise Basin Experimental Forest near Idaho City, Idaho.

Method of Study

The analysis is based on tallies from five randomly selected subplots from each of seven noncontiguous 10-acre harvest cutting plots, or a total of 14 acres. Each subplot had an equal chance of being selected for tally except those entirely lacking in poles which were not considered. Although Douglas-fir occurs as an associate of ponderosa pine in this region, particularly on north aspects, no instance of feeding was recorded for this species, so it is excluded from all data presented unless specifically mentioned. This makes for a slightly higher figure in some instances of the item "percentage fed on" because Douglas-fir comprised over 13 percent of the total number of trees examined.

Trees were measured and observed for crown class, diameter breast high, total height, presence or absence of feeding scars, height of scars, and nature of defect.

Results

In order to test certain hypotheses, chi-square analyses were made along the lines suggested by Snedecor (*7*). The following interpretations were indicated:

1. The denser the pole stand, the greater the percentage of stems fed on.

2. There appears to be a relationship between the number of instances of feeding in the first log-length and the total number of feedings in both the first log and higher portions of the trees (approximately 1:5). This relationship is strongest for totaled data but not uniform when calculated for individual plots.

3. The occurrence of trees fed on once is independent of the number of trees fed on more than once. This relationship also holds true when the data are grouped by crown classes.

4. When all subplots showing

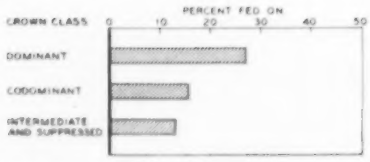

FIG. 1.—Percentage of poles fed on by crown classes.

occurrence of feeding are considered, or when data are totaled for plots, there is evidence that the occurrence of porcupine-caused crook, fork, and spike-top defects (combined) is related to the total number of feedings occurring.

5. When data are grouped by crown classes there is a significant relationship between number of poles fed on and the total number of poles present in each crown class.

When the percentage of poles fed on is considered in relation to the number occurring in each crown class they take the form illustrated schematically in Figure 1.

Further analysis indicates that the percent of poles fed on increases with d.b.h. until a diameter of 10.9 inches is reached, after which it declines and little or no feeding of consequence is found above 13.9 inches d.b.h. (Fig. 2), indicating a definite preference for pole size.

Taylor (*8*) working in ponderosa pine stands in the Southwest which had been cut 16 years previous to examination and which are therefore fairly comparable to stands in this study, discovered a similar trend. Tree sizes analyzed ranged from 6 inches high to over 20 inches d.b.h. Highest percent (50) of seriously injured trees occurred in the 4- to 10-inch d.b.h. class.

It should be appreciated that Figure 2 represents the composite of a number of small even-aged stands over a considerable area on which porcupines have been feeding for many years. Many of these stems have been fed on more than once. The same pattern of feeding would probably be portrayed if an age series of ponderosa pine plantations were similarly analyzed. It should not be concluded, however, that this relationship will hold true regardless of age of stand, number of sizes present, or whether the stand is mixed or pure. Porcupines' feeding habits vary widely and selectively even within a region, depending on the type of forest cover (*2*). Rudolf (*6*) found the heaviest feeding in the largest diameter class (7 inches) where a range of diameters of 3 to 7 inches existed within Scotch pine plantations, but Rearden (*5*) working in a single plantation where diameters ranged from 1 to 9 inches, found a distinct preference for trees in the 3- to 6-inch size.

Based on the 35 subplots (1,872 trees on 14 acres) used in the analysis, the following additional statistics were revealed:

For ponderosa pine poles:	
Average number per acre	134.4
Average number per acre fed on	20.2
Average percentage fed on	15.0
For poles fed on:	
Percentage fed on in first log	22.3
Percentage fed on more than once	11.7
Percentage fed on having crook, fork, or spike-top	69.6
For ponderosa pine and Douglas-fir poles combined:	
Average number per acre	151.5
Percentage fed on	13.3

Conclusions

What can be done to reduce feeding activity of porcupines in young pole stands of ponderosa pine? Since a preference for thickets has been clearly indicated, thinnings in them would tend to reduce the percentage of poles attacked. Reducing the percentage fed on would also reduce the number of feedings (number of trees attacked and number of feedings coincided in 19 out of the 26 subplots in which feeding occurred). This reduction would tend, in turn, to reduce the occurrence of damage caused by feeding in the first log-length and finally, the number of occurrences of the more serious porcupine-caused defects of crook, fork, and spike-top.

Since a preference is demonstrated by the porcupine for trees in the 8- to 10-inch diameter class, thinnings in stands where all trees approach this size might decrease the percentage fed on appreciably. If poisoning is to be practiced, the dominant trees in the 8- to 10-inch class would appear the most suitable ones in which to place bait blocks.

Because no tree was killed it cannot be said that feeding by the porcupine has resulted in a reduction of stocking per acre, or, stand damage, in this size class. In the thickets, where feeding is most frequent and the most stems per acre are attacked, the unattacked codominant trees will replace (in dominance) the dominants providing there is little differentiation

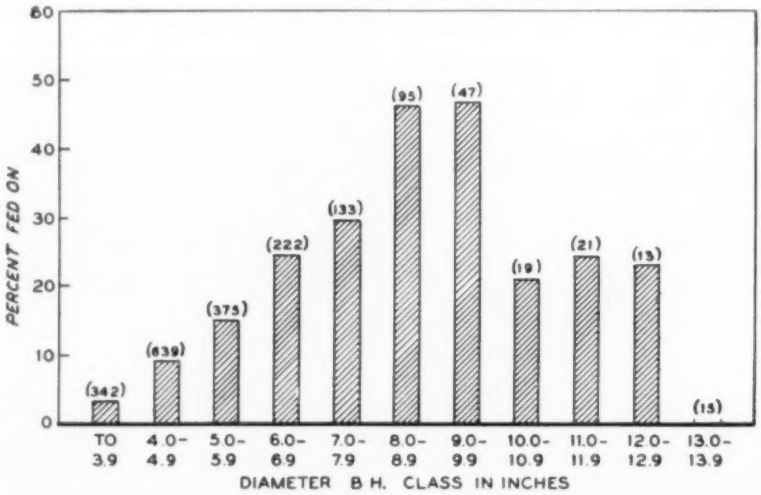

FIG. 2.—Percentage of poles fed on by diameter classes. Total number of trees in each class shown in parentheses.

in height. If the height differential is pronounced and the top of the dominant attacked is girdled and killed, a crook or fork will ensue. If this crook is at or above the first log length on an obviously dominant tree, there is no reason why this tree cannot be pruned and maintained as a dominant by stand improvement work. Pruning may slow down further attacks on that stem in the future. Where feeding has occurred in the first log of a dominant pole but has produced no crook or fork, the tree can occasionally be pruned as a crop tree if no others are available because commonly most scars do not permit entrance of fungi, due to heavy pitching.

Stand damage by porcupine can and does occur in understocked areas where already branchy, fairly young, dense-foliaged trees are fed on. Reasons for porcupines' feeding in this type of stand are not completely understood but the results distort the form of the tree until it is of little use for saw logs. Direct control (poisoning, shooting) supervised by wildlife technicians should probably be practiced in such instances.

Apart from their uniqueness and their symbiotic relationship with other mammals (*1, 3*), porcupines constitute a segment of the animal community and as such should not be exterminated. Direct control measures are unquestionably justified in sections of the country where population increases occur and serious stand damage results, but indirect control (intermediate cuttings and reliance on predators) through intelligent planning based on local facts and observations may often produce satisfactory management of forest stands and reduce control costs substantially.

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Members granted such retired status in the Society must continue to pay Section dues in order to continue as Section members.

The Relationship Between the Number of Trees Per Acre and the Percentage Stocking of Reproduction[1]

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THE STOCKED QUADRAT method is widely used to sample the density of stocking of natural regeneration. A quadrat is frequently one one-thousandth of an acre, or one mil-acre, in area and circular or square in shape. Four mil-acre quadrats, located in a square or in the four quadrants of a circle, may be combined to form a 4-mil-acre or 1/250th-acre plot. Irrespective of size, a quadrat is considered to be stocked if it contains one or more well-established seedlings. Stocking is the number of stocked quadrats divided by the total number of quadrats, expressed in percent.

Foresters often wish to know the total number of seedlings present on an area on which a given stocking has been observed. To count all established seedlings on each quadrat is time consuming. A satisfactory alternative is to establish the relationship existing between number of seedlings per acre and stocking percent for the forest conditions under study.

The Study

Such a study was undertaken by the author in the spring of 1951 on lands of the Crossett Lumber Company, Crossett, Arkansas. Pine regeneration was sampled in two classes of selectively-cut forest, (1) areas cut over for hardwood chemical-wood in order to encourage or release pine regeneration and (2) areas logged for pine sawlogs and/or pulpwood. Plots, each consisting of four 6.6-foot-square mil-acre quadrats with a common corner, were tallied at one-chain intervals on lines 10 chains apart run in a cardinal direction. As, in practice, the percentage stocking for an area was based on an average computed from sixteen to thirty-two plots, for the purpose of analysis each set of 10 adjacent plots was treated as a group. Care was taken to ensure that all plots in a group fell in the same treatment class. The total of 990 plots measured thus provided 99 groups for each of which averages were computed for (1) number of trees per acre and (2) stocking based on mil-acre quadrats.

Analysis

A scatter diagram of number of trees per acre plotted over stocking percent on rectangular co-ordinate paper showed a curvilinear trend, concave upward, and a scatter of points that increased with the stocking percent. A transformation of one or both variables was desired that would give a linear trend, with the plotted points normally and uniformly distributed about it at all values of the independent variable.

Nature of the distribution of seedlings

If the seedlings were sparse and randomly distributed, one would expect the numbers of seedlings observed to follow the Poisson distribution. As density of seedlings increased, the observed numbers would tend to approach the normal distribution. For such distributions the number of seedlings should show a linear correlation with minus the logarithm of one minus the stocking, where the stocking is expressed as a decimal. This transformation was tested and proved to be useful only for the range of stocking from 0 to 25 percent. Above 25 percent the relationship was no longer linear and the points were more widely scattered. This indicated that in sparsely stocked areas the presence of seedlings was truly random. In more densely stocked areas, however, heterogeneity, or clump-wise distribution of seedlings became pronounced. Areas favorable for regeneration contained large numbers of seedlings; unfavorable areas were unstocked due to the presence of clumps of residual trees, brush patches, swampy areas, etc. The latter maintained a brake on the stocking percent, the former increased the number of seedlings far beyond the number expected had the distribution of seedlings been random.

An appropriate transformation

An alternate transformation was, therefore necessary. When number of trees was converted to logarithms and plotted over stocking percent, as in Figure 1, the trend became linear and the scatter normally distributed and reasonably uniform throughout the range of stocking. Use of this transformation thus permitted the calculation of linear regression lines for the relationship between number of trees per acre and stocking percent for each forest condition sampled and led to an efficient test of the difference observed between these regressions. If X = stocking percent and Y = number of seedlings per acre, the linear form of the relationship is $\log Y = A + BX$, and the curvilinear form, when plotted on cross-section paper, is $Y = ab^X$, where a = anti-logarithm

TABLE 1.—STATISTICS DESCRIPTIVE OF THE RELATIONSHIP BETWEEN NUMBER OF TREES PER ACRE AND STOCKING PERCENT FOR EACH TREATMENT CLASS

Statistic	Treatment	
	Chemical-wood	Sawlog-pulpwood
No. of groups of 40 quadrats	67.	32.
Average percentage stocking	50.37	50.55
Average logarithm of number of trees	3.1842	3.215614
Average number of trees per acre	1528.	1643.
Slope of the line, B	0.02077	0.02319
Upper limit of B, P = 0.05	0.02297	0.02573
Lower limit of B, P = 0.05	0.01857	0.02065
Estimated Y when X = 50	3.176578	3.203443
Upper limit of Y, X = 50, P = 0.05	3.259299	3.261830
Lower limit of Y, X = 50, P = 0.05	3.093858	3.145056
Anti-logarithm of estimated Y, X = 50	1501.7	1597.5

[1]Adapted from a paper submitted to Dr. Walter H. Meyer in partial fulfillment of the requirements for the degree of Master of Forestry, School of Forestry, Yale University, May 1951.

of A and b = anti-logarithm of B. Statistics calculated separately for the chemical-wood areas and for the sawlog-pulpwood areas are given in Table 1.

Regression equation for pooled data

It is apparent from Table 1 that there is no significant difference between the two treatment areas sampled in either the slope of the regression line, B, or the level of the estimated Y when X = 50. Confidence limits for these statistics at the 5 percent level are shown to overlap considerably. Consequently all the above data, together with 20 additional groups collected in a methods-of-cutting study, were pooled and the new regression equation was calculated to be $Y = 193.3\ (1.0416)^X$. This regression line is plotted in the accompanying figure and the pertinent statistics are given in Table 2.

Tolerance limits

Tolerance limits of the predicted value of Y for one standard error, enclosing approximately 68 percent of the expected values, are shown in the accompanying graph. These were calculated from the relationship $Y_L = Y \pm ts_Y$ where Y = curve value at a chosen value of X, t has N − 2, or 117, degrees of freedom, and s_Y = standard error of estimate of Y for a selected value of X. s_Y was computed using the relationship of $s_Y^2 = s_A^2 + (X - \bar{x})^2 s_B^2 + s_{y \cdot x}^2$, which takes into account the three contributing sources of error in the prediction of Y. These are (1) the variance of the estimate of the mean, s_A^2, (2) the variance of the estimate of the slope of the regression line, s_B^2, the effect of which is zero when $X = \bar{x}$ and which increases as the square of the distance therefrom, and (3) the variance of the estimate of y on x, $s_{y \cdot x}^2$. With increase in data s_A^2 and s_B^2 become negligible and s_Y^2 approaches $s_{y \cdot x}^2$. These tolerance limits provide an estimate of the range in number of trees that may be expected for a given percentage stocking, a range that would be exceeded 32 times out of 100, in the long run.

Short-cut method of solution

Where lack of a suitable calculating machine makes the least squares solution used above tedious or impractical, some reasonably efficient short-cuts may be adopted. A semi-graphical solution, described by Bliss and Calhoun (*2*), as modified from Bartlett (*1*), is useful to determine the functional, linear, relationship between two variables. Divide the data into three approximately equal groups, based on the independent variable, x, such that there is an equal number of paired values in the first and third groups ($N_1 = N_3$). Calculate the means for the first and third groups and for the data as a whole, $(\bar{x}_1, \bar{y}_1)$, $(\bar{x}_3, \bar{y}_3)$, and $(\bar{x}, \bar{y})$, respectively. Plot these three means on the graph, and pass a straight line through the points $(\bar{x}_1, \bar{y}_1)$ and $\bar{x}_3, \bar{y}_3)$. The required linear relationship is defined by a second line, with the same slope as the first, passing through the general mean, $(\bar{x}, \bar{y})$.

Descriptive statistics of the above regression line may be determined graphically by a short-cut method described by Spurr (*3*). Tolerance limits are obtained by drawing lines parallel to the regression line so as to exclude one-sixth of the plotted points above the upper limit and one-sixth below the lower limit, the distance between them, measured vertically, corresponding to $2s_{y \cdot x}$. The standard deviation of the dependent variable, s_y, is obtained in a similar manner by drawing horizontal lines below the upper sixth and above the lower sixth of the plotted points, the distance between them representing $2s_y$. The alienation coefficient, AC, is then computed as $2s_{y \cdot x}/2s_y$, or $s_{y \cdot x}/2s_y$, and the correlation coefficient, r, is $\sqrt{(1 - AC^2)}$. Estimates of statistics obtained in this manner are tabulated in Table 2.

Table 2.—Statistics Descriptive of the Relationship Between Number of Trees Per Acre and Stocking Percent, Irrespective of Treatment

Statistic	Symbol	Method	
		Least squares	Short cut
Slope of the line	B	0.017714	
Anti-logarithm of B	b	1.0416	
Y intercept when X = 0	A	2.28631	
Anti-logarithm of A	a	193.3	
Y intercept when X = 50	Y_{50}	3.17201	
Anti-logarithm of Y_{50}	y_{50}	1486.0	
Variance of y	s_y^2	0.21816	
Standard deviation of y	s_y	.4671	0.4657
Variance of Y-estimate	s_Y^2	.03443	
Standard error of Y-estimate	$s_{y \cdot x}$	.1856	.1621
Alienation coefficient	$s_{y \cdot x}/s_y$	.3973	.3482
Correlation coefficient	r	.918	.937
Efficiency of method, based on r^2, assuming the least squares method gives the best possible fit		1.000	.958

Application

A logarithmic transformation of the dependent variable has been used to produce a rectilinear instead of a curvilinear relationship between number of trees per acre and stocking percent. This has facilitated a test of significance in the differences observed in this relationship under various forest conditions, but the transformation has also modified extreme values so that they fall in a uniform band bisected by the regression line. For the purpose of prediction, in order to make the transformed values comparable to the original values of the dependent variable, 1.15 times the variance of the estimate, $s_{y \cdot x}^2$, must be added to the transformed values read or calculated from the regression line. The corrected regression line, on semi-logarithmic paper, would thus be a straight line passing through the points (0,211.8), (50, 1627.8), and (100, 12511.2). For instance, the most probable number of trees per acre corresponding to a stocking of 50 percent would be 1628 instead of 1486, the value of y_{50} in Table 2. The tolerance limits, however, may be used without correction.

Conclusions

1. For the forest conditions sampled, in sparse reproduction the seedlings were randomly dis-

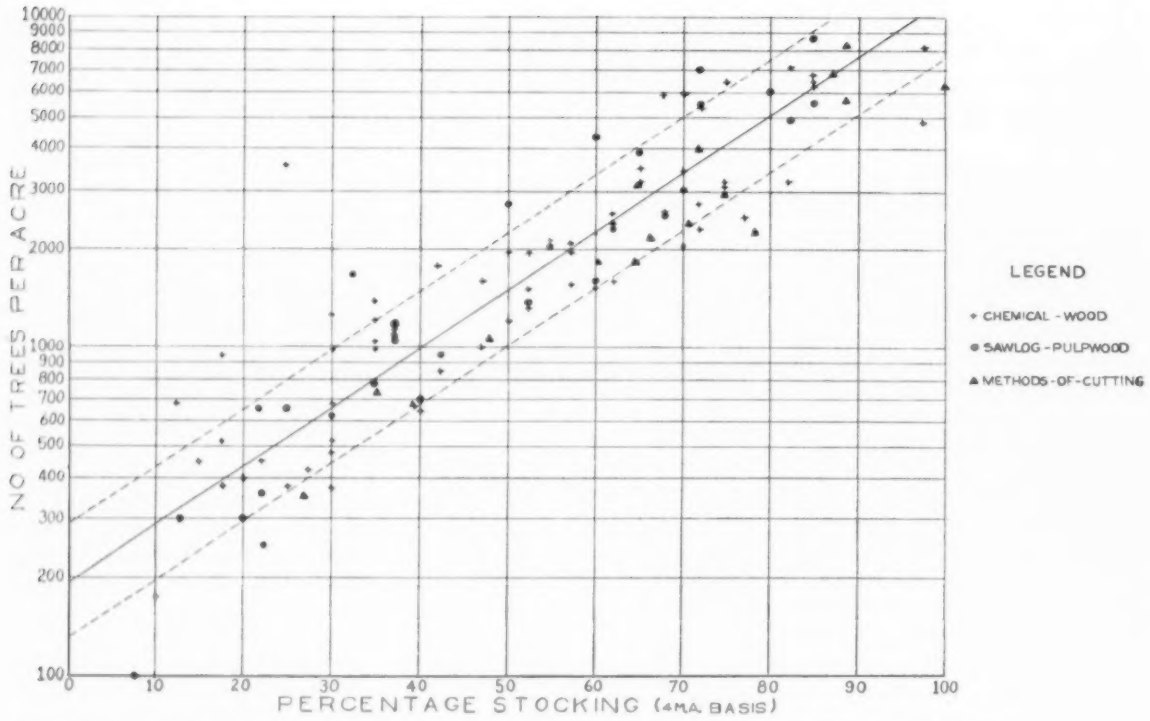

FIG. 1.—Relationship between number of trees per acre and percentage of stocking based on 40-mil-acre quadrats.

tributed whereas in medium to dense reproduction (over 25 percent stocking) the seedlings tended to occur in clumps.

2. Using the data collected in this study, a satisfactory linear relationship between number of trees per acre and stocking in percent was obtained by transforming number of trees per acre to logarithms, i.e., by using semi-logarithmic paper. Although the calculated regression line and its tolerance limits apply specifically to the cut-over lands studied, they may also prove applicable to other southern pine lands.

3. The extent of the applicability of this transformation has not been fully determined. It has proved useful in the study of coniferous regeneration on cut-over lands in the Douglas-fir region in British Columbia, and, in general, may be expected to apply wherever reproduction tends to occur in clumps.

4. This transformation makes possible an efficient test of the variation in the relationship of number of trees per acre to stocking percent for various forest conditions.

5. With some loss in efficiency, graphical short-cut methods may be used to determine the regression equation, tolerance limits, and the correlation coefficient.

6. The above transformation will be found useful even when a scatter diagram on semi-logarithmic paper shows some curvature. The curvilinear effect, and consequently the difficulty of fitting a free-hand curve, will be materially reduced. In this case, however, the mathematical relationship existing between the variables cannot be readily determined.

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Reader comments are solicited regarding the typography of subheads in this article, which depart from usual JOURNAL form.

Planes Release Tree Plantation

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A continuous campaign is being waged to put back into production a 6,000 acre tract of fertile forest land, potentially capable of producing an average of 800 to 1,000 board feet of wood per acre per year.

FIG. 1.—The dense stand of alder in the foreground is choking out a 10 year old plantation of conifers.

IN 1941 the government acquired and assigned to the Siuslaw National Forest a 12,000 acre tract of cutover land in about the center of the Oregon coast between Waldport and Yachats. Huge stumps of Sitka spruce and Douglas-fir left evidence of the enormous crop removed by logging between 1919 and 1936. Although slash had been burned currently, an accidental fire in 1936 reburned almost the entire area, killing most of the seed trees and some of the remaining timber.

Immediate steps were taken by the Forest Service upon acquisition of this land to put it back into the production of conifer trees. A camp was built so that the labor of Civilian Conservation Corp boys would be available. Tree planting was started in an attempt to get ahead of the fast-growing competition of brush and alder. Railroad grades were converted to truck roads and a lookout tower was constructed.

War came as the forest rehabilitation program was being initiated, but did not delay action as the C.C.C. labor was immediately followed by a company of conscientious objectors. Planting progressed as follows:

Winter	1941-42	979 acres
"	1942-43	3,100 "
"	1943-44	1,500 "
	Total	5,579 "

By 1945 brush and alder had grown so fast over the rest of the non-timbered land that planting was impractical and it began to give serious competition to plantations already established in the lower elevations and ravines. By the winter of 1947-48 the competition had become so severe over 3,000 acres (about half the plantation) that action was needed to save the planted trees. See Figure 1.

While the planted conifers (Sitka spruce, Douglas-fir and Port Orford cedar) were then from 2 to 8 feet in height, the alder had grown to be 10 to 20 feet tall. In many cases a single alder was overtopping and whipping the leaders of four to six planted trees.

In the winter and spring of 1948 mechanical and chemical treatments were tried experimentally to determine the most feasible method of controlling the alder and willow. About 120 acres were treated that first year. By numerous experiments from that beginning, satisfactory methods of release that are not too expensive have been developed.

Airplane Treatment

Spraying with 2,4-D from an airplane proved to be the most satisfactory and cheapest method of releasing the conifer plantation from alder competition. This method was used in June and July of 1951 to release 1,000 acres. Within a month the foliage had fallen from the sprayed alder as though a fire had gone through the area. The following spring the alder showed practically no sign of life. The release proved quite effective. See Figures 2 and 3.

The other species of deciduous trees and brush were not seriously injured. Very little of the willow was completely killed, but it was set back enough to release the conifers in most cases. Elderberry was defoliated but it was as vigorous as ever the following year. Salmonberry, salal, and vine maple were not affected.

Spraying was done only on cool, quiet days to avoid killing plants or trees on adjoining property. Even so the spray was so volatile that it spread one-eighth of a mile against the breeze and in some cases drifted a half-mile with the breeze, which never exceeded 10 miles an hour during the operation. The planes flew at 200 feet for safety reasons, allowing more drift than if they had flown at tree height.

The spray solution used per acre consisted of 2 pounds acid equivalent of 2,4-D ester (isopropyl) and 2 ounces of a sticker-spreader. This was mixed with 8 gallons of water per acre for part of the area and with 7 gallons of water and 1 gallon of diesel oil over the remainder. The results were equally effective, indicating that the oil was not necessary.

The job was done under contract for $4.61 per acre. This included both flying and material. Surveying the plantation to determine the area needing release, posting flags and markers at the corners of the blocks chosen for flying, and other administrative costs, brought the total cost to $5.15 per acre.

Development of Treatment

Back of this project was a series of experiments, the first to determine the best solution for use. Mr. Virgil Freed of the Oregon State College assisted District Ranger Hopkins in treating nine different 1-acre plots with types of 2,4-D spray and dust.

The spray was applied from a tank truck and pump on the road. It was obvious from the start that although this method might be successful for roadside treatment, it would be too expensive for covering a large area. Too much time and labor was lost in pulling hose around and in refilling the tank truck. It took 300 gallons of water to cover an acre in contrast to the eight gallons later found adequate from the air. Labor cost was $16.50 per acre, and the total cost was $23.40 per acre on a 4-acre project.

The best solutions tried in this test were the sodium salt and the ester of 2,4-D. Following is a summary of the results:

	Solution	*Application*	*Results*
A.	Ester of 2,4-D, 3.34 lb. acid equivalent per gal.	3½ qts. to 100 gal. water per acre.	95 percent kill except on trees over 5" d.b.h.
B.	Sodium salt of 2,4-D 60 percent acid equivalent.	4.8 lbs., ⅓ pt. spreader sticker, 100 gal. water per acre.	80 percent kill, but 95 percent effective in killing tops.
C.	Sodium salt of 2,4-D 75.9 percent acid equivalent	4.1 lbs to 100 gal. water per acre.	95 percent effective, but 20 percent sent out vigorous shoots.
D.	Liquid salt (Ammine) 40 percent acid equivalent.	3 qts. to 100 gal, water per acre.	50 percent kill, with less on the dense alder stands.
E.	Ester Dust 2,4-D 5 percent acid equivalent.	10 lbs. per acre.	Killed tops and retarded growth.

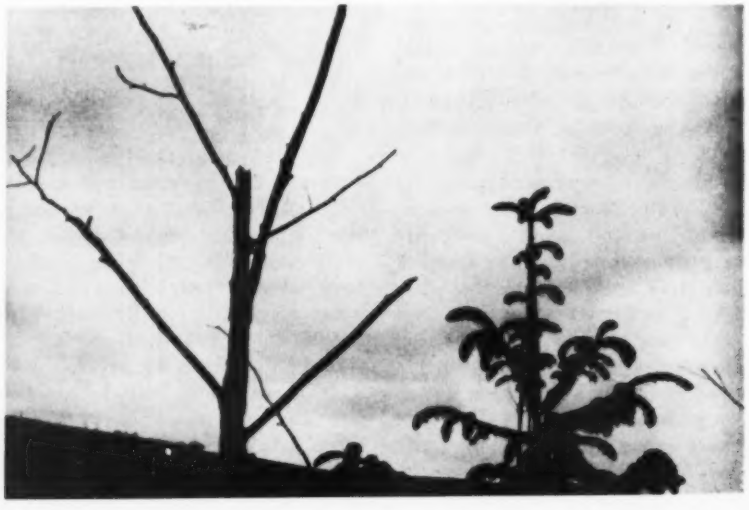
As a result of this trial, application was made from the air using the ester of 2,4-D in both dust and spray form.

The dust proved just as effective as the spray but was so difficult to confine to the desired area that its use was discontinued. A minimum buffer strip of 2 miles was needed. This difficulty was discovered when a 30-acre block was dusted in June with Chipman 10-percent dust at the rate of 30 pounds (3 pounds of 2,4-D acid equivalent) per acre. Although there was no apparent breeze, some of the dust drifted down the valley. The tops of the alders in the creek bottom were killed one-half mile below the plot. From this point the dust had fanned out and light brown streaks of dead alder leaves could be traced in August as the killing power of the dust became dissipated. Some of the exposed conifer saplings had a little curl in the leaders, but by the last of August had straightened upright again.

The spray, on the other hand, drifted with a breeze, but very little without. The first plot of about 20 acres was sprayed from the plane in June with a solution of 2,4-D ester at the rate of 1 gallon (3.34 pounds acid equivalent)

FIG. 2.—A year after being sprayed the alder trees showed practically no signs of life in June and gave the planted conifers a lattice-like shade similar to their early life in the nursery. Note slow growth and damaged leader of conifer.

FIG. 3.—Three years after spraying the alder was being broken off and blown over by winter storms. The spruce was growing 20 to 24 inches in height per year.



per acre mixed with 8 gallons of diesel oil. As previously noted, the oil was later found to be unnecessary as a foliage spray for alder. The heavy mixture of 2,4-D and oil killed practically all of the alder and most of the willow. It did not kill other species but did damage the growing tips of most shrubs. The leaders of conifers that were under alder curled down, but had again straightened up by August. Exposed conifers, however, suffered leader and branch tip damage. Some of the hemlock was killed back two to three years' growth. Practically all of the leaders of the Douglas-fir and Sitka spruce curled down. A few curled completely around, forming an "O," and continued growing up again. In the areas in which conifers received the full application of oil spray, at least a full year's growth was lost.

Later applications overcame the damage to conifers by using water instead of oil and reducing the amount of 2,4-D from 3.34 pounds acid equivalent to 2 pounds acid equivalent per acre. Many of the conifers that did not have the alder canopy over them showed a slight "S" curl in the leaders but by the second growing period they had straightened again. See Figure 4.

Marking corners on the ground so the pilots could distinguish the boundaries was quite a problem in the dense brush. White cheesecloth was tried, but was too easily mistaken for weathered logs. Both red and yellow cheesecloth were then used with the latter proving much the better. A strip about 12 inches wide and 6 feet long was enough if it was draped out straight over brush or a stump out in the open. It helped to have one marker stretched on the ground and another stretched out as a flag in a tree or on a pole. Aluminum foil was excellent when placed on a bare spot on the ground or on a stump in the open. Both the foil and cheesecloth were fastened to poles, trees, or stumps with stapling hammers.

The cost of spraying 100 acres in 1950 amounted to \$1.50[1] an acre for flying, plus the cost of the material. The 10-percent dust cost \$0.15 a pound and the 2,4-D ester cost \$3.33 a gallon (3.34 lbs. acid equivalent).

[1]1950 flying cost.

FIG. 4.—*Left*—Curl in current year's growth on branch tips and leader of Douglas fir exposed to full concentration of spray. (3.34 pounds 2,4-D, acid equivalent and 8 gallons diesel oil per acre).

Right—Next year the leader had partly straightened out. Weaker solutions (2 pounds 2,4-D and 8 gallons water) made only slight curl in exposed conifer leaders.

Girdling and Chopping

Before chemical treatment was adopted, release work was undertaken by felling the smaller alder trees and girdling the larger ones, using light weight axes. At first the stumps and girdles were cut at the height most convenient, ranging from 2 to 4 feet. Later the stumps were cut close to the ground to avoid accident. All the limbs were slashed off close to the trunk below the girdle or stump.

This work was done periodically during the winter and spring months of 1948, 1949 and 1950. The first winter only a few alder, 4 to 7 inches in diameter, were girdled but the process was given a more extensive trial the winter season of 1948-49. During this period a girdling tool developed by Boyd Rasmussen was used. This tool, consisting of a few links of a chain saw alternately arranged, made a girdle about ¼ inch wide. Only one cut was used at the start; however, later examination of the girdled trees showed some bridging where a small amount of cambium was left in a depression. Therefore it was found desirable to use two cuts about 1½ inches apart. Trees over 4 inches in diameter were girdled and the rest were chopped down.

On the whole, the results of chopping and girdling were quite successful in obtaining the desired release. Most of the stumps coppiced quite readily, however, and so did the trees girdled with a deep cut. The most successful work seemed to be a girdle made with a shallow cut. Indications are that a shallow cut allowed water and food to flow up to the leaves but stopped the return flow of food to the roots. In this manner the tree slowly starved itself to death.

The Rasmussen tool has given more consistently satisfactory results than the axe, probably because it made a shallow cut. Some of the girdles made with the chain saw resulted in death within the first year. Although a few sprouts grew for a short time, they died; the trunk rotted at the girdle and blew over during the storm winds of the winter.

Other girdled trees survived two more growing seasons. During the second summer the foliage became progressively more yellow as the summer advanced, so that there was little doubt that the trees were slowly dying. By the next summer most of the trees were dead as well as some weak sprouts that had started below the girdle.

The cost of this type of treatment varied according to the density of the alder and brush. One

project of 115 acres was completed at an average labor cost of $7.50 per acre. The alder trees were scattered and the brush was not excessive. One man was able to cover 1.13 acres per day, or 0.88 man days per acre.

At the other extreme was a stand of 72 acres that was slashed and girdled for an average labor cost of $15.50 per acre. This area was well stocked averaging 520 alder trees per acre ranging in d.b.h. from 2 to 6 inches and in height from 15 to 30 feet. In this type, one man was able to cover just half as much, .6 acre per day or 1.68 man-days per acre.

Summary

1. Alder was killed economically from the air by using 2,4-D at the rate per acre of 2 pounds acid equivalent mixed with 8 gallons of water and 2 ounces sticker-spreader.

2. While this light application killed the alder and set back willow, it did very little damage to other species of trees or brush.

3. The cost of spraying 1,000 acres in 1951 was $5.15 per acre including marking, flying and material. Flying alone was $2.00[2] per acre.

4. Ester of 2,4-D as a spray was the best form to use. The dust was quite effective but almost impossible to confine to the desired area.

5. Chopping and girdling was not as practical in release work as the application of 2,4-D over a large area because it cost more and because alder coppiced quite freely.

[2]1951 flying cost.

ARTHUR W. GREELEY

Greeley Named Regional Forester For Alaska

As this issue went to press word was received that Arthur W. Greeley has been named Regional Forester for Alaska.

Mr. Greeley will succeed Frank Heintzleman who was recently appointed governor of the territory. (See Forestry News section.) At the time of his appointment Greeley was assistant to the director of the Pacific Northwest Forest and Range Experiment Station in Portland, Ore., a position he has held since 1951. Previously he had served with the Forest Service in varying capacities including forest supervisor and timber management assistant in the office of the Chief Forester in Washington. He received his bachelor's degree in forestry from the University of Washington in 1934 and his master's from Yale the following year.

Ecology and Silviculture of the Engelmann Spruce-Alpine Fir Type[1]

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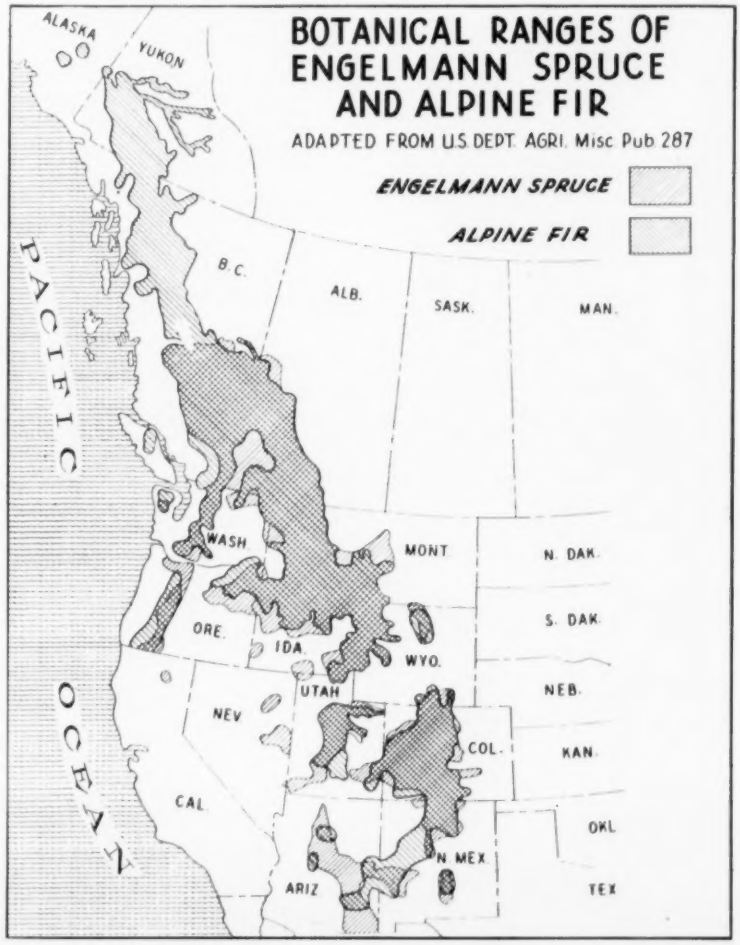
The Engelmann spruce-alpine fir type, which extends from the latitude of central British Columbia in Canada almost to Mexico, contrasts in many ways with its eastern counterpart. Although basic silvical characteristics of the type species are similar to those of the eastern species, differences in climate, soil, and associated vegetation require some variations in recommended silvicultural practices. The authors discuss silvicultural systems best adapted to the spruce-fir stands of the Rocky Mountains.

UNLIKE eastern North America, which possesses only three indigenous spruces — *Picea rubens* (Sarg.), red spruce; *P. glauca* (Moench) Voss, white spruce; and *P. mariana* (Mill.) B.S.P., black spruce—and two true firs—*Abies balsamea* (L.) Mill., balsam fir; and *A. fraseri* (Pursh) Poir, Fraser fir —the West is more generously endowed with different species of these genera. It contains six spruces and nine true firs.[2] All true firs and spruces possess many similar silvical traits. Hence, in undertaking to interpret and evaluate western spruce-fir silviculture, some thought was given to encompassing all native species. However, the immense geographic extent, with attendant wide variations in climate, influenced the writers to limit the discussion chiefly to a single forest type—Engelmann spruce-alpine fir. There is one exception. Western white spruce overlaps Engelmann spruce in parts of British Columbia and it grows in mixture with alpine fir in Alberta on the eastern slopes of the Rocky Mountains. Silviculturists in British Columbia and Alberta generally regard western white and Engelmann spruce as essentially alike from the standpoint of forest management (*6*). Hence, much of the discussion which follows should be understood to apply to western white spruce in the Canadian Rockies as well as to Engelmann spruce.

The Engelmann spruce-alpine fir forest type was singled out primarily because ecologically it is the western mountain counterpart of the boreal spruce-fir association of the East and far North. Hence, we hoped that its silvicultural problems could be compared more directly with those of the eastern spruce-fir forests. In other words, the Engelmann spruce-alpine fir type has a great deal more in common with the eastern types than, for instance, Sitka spruce, grand fir, white fir, and blue spruce.

The range of the Engelmann spruce-alpine fir association is ex-

FIG. 1.—Distribution of Engelmann spruce and alpine fir.



[1]Presented at S.A.F.-C.I.F. meeting, Montreal, Canada, Nov. 1952.

[2]Spruces: *Picea engelmanni* (Parry) Engelm., Engelmann spruce; *P. sitchensis* (Bong.) Carr., Sitka spruce; *P. pungens* Engelm., blue spruce; *P. glauca* var. *albertiana* (S. Brown) Sarg., western white spruce; *P. breweriana* S. Wats., weeping spruce; and *P. mariana* (Mill.) B.S.P., black spruce. Firs: *Abies concolor* (Gord. & Glend.) Hoopes, white fir; *A. lasiocarpa* Nutt., alpine fir; *A. amabilis* (Dougl.) Forb., Pacific silver fir; *A. grandis* (Dougl.) Lindl., grand fir; *A. procera* Rehd., noble fir; *A. magnifica* A. Murr., California red fir; *A. venusta* (Dougl.) K. Koch, bristlecone fir; *A. arizonica* Merr., corkbark fir; and *A. balsamea* (L) Mill., balsam fir.

tensive. It reaches from the central interior valleys of British Columbia southward through the Rocky Mountains and outlying mountainous tracts to Mexico (Fig. 1). Locally, its distribution as a forest type is generally restricted because both the spruce and the fir require cool, moist habitats which can be found chiefly on the higher mountains, north slopes, and narrow, sheltered valley bottoms. However, toward the northern portion of its range in British Columbia, it spreads out more aggressively and forms one of the major forest types. Southward from Montana and Idaho to New Mexico, other forest types including lodgepole pine, Douglas-fir, and ponderosa pine, occupy much larger acreages.

Despite the limited area of spruce-fir type, it is economically of considerable importance. Spruce enjoys the reputation of being one of the better softwoods for lumber, as well as the best of all trees for pulpwood. Growth is relatively good because the type occurs where precipitation is abundant. Since it grows well on western white pine sites also, the United States Forest Service is seriously considering spruce as one of the more promising substitutes for white pine in those areas where the blister rust disease has already or is likely to eliminate the latter species. Should this happen, future production of spruce will be substantially augmented. Large volumes of virgin spruce timber still remain in the Rocky Mountains and rapid acceleration of the cut in the near future is foreseen. It is not too soon for silviculturists to be assembling the information needed in order to plan good silvicultural practices for the type.

FIG. 2.—Mature Engelmann spruce—alpine fir stand on the Lolo National Forest, Montana.

U. S. Forest Service Photo

Silvical Characteristics

Spruce-Fir: a Stable Type

Engelmann spruce and alpine fir form the dominant elements in a stable plant society or near-climax vegetational association throughout much of the area which they occupy. A number of other species such as lodgepole pine western white pine, whitebark pine, and Douglas-fir are likely to be found in mixture, especially in younger stands, but generally the spruce and fir crowd them out because of greater shade tolerance. To silviculturists, the stability of the spruce-fir type is of the greatest importance. It means that spruce and fir cannot be easily displaced by other vegetation and the natural tendency is for them to return if they are eliminated by logging or agents such as fire, insects, diseases, and storms.

Growth

Both Engelmann spruce and alpine fir attain considerably larger sizes than their counterparts in the East. Mature, dominant Engelmann spruce often are 150 to 160 feet tall, and contain six 16-foot logs (Fig. 2). The larger trees are usually about 40 inches d.b.h. but a few exceed 60 inches d.b.h. Mature trees generally contain little heart rot. Alpine firs grow almost as tall as neighboring spruce of equal age but diameters are seldom as large. A d.b.h. of 30 inches is exceptional. Alpine fir suffers severely from heart rot, and many trees are total culls under present utilization standards.

Engelmann spruce differs from many Rocky Mountain trees in diameter growth behavior. If Engelmann spruce trees have room, they are likely to continue growing steadily in diameter up to an age of 300 years. In comparison, the growth of western white pine slows down at 100 to 120 years, Rocky Mountain Douglas-fir at about 100 years, western larch at less than 100 years, and lodgepole pine at 50 to 80 years.

Recently some thrifty 180-year-old spruce were examined on the Kaniksu National Forest in Idaho. The stand had been thinned by a 75 percent partial cutting 25 years earlier. Since the time of thinning, these trees, which now range in diameter from about 20 to 30 inches, had been growing about two inches per decade. They showed no signs of diminishing growth after the initial spurt. By contrast, the growth of ponderosa pine and larch would be expected to slow down 10 or 15 years after a thinning. Alpine fir does not possess a similar capacity to maintain good growth at advanced ages.

Both Engelmann spruce and alpine fir generally grow exceedingly slowly in the seedling stage, even under what appear to be favorable conditions. The senior author compared early height growth of the two species with eastern white and black spruce and with balsam fir, respectively, in a northern Minnesota nursery several years ago. Engelmann spruce showed height growth inferior to the eastern spruces for the first five years and alpine fir started more slowly than balsam fir.

Shade Tolerance

Alpine fir appears to be practically identical with balsam fir in relative ability to endure shade, but Engelmann spruce is definitely somewhat less shade tolerant. Western foresters (*1*) have ranked alpine fir in the most shade-enduring category, "Very Tolerant," but Engelmann spruce is rated only "Tolerant." The writers agree with these classifications. Shade-tolerance is one of the most vital silvical factors in the practice of silviculture where two or more kinds of trees having the same habitat requirements are managed in mixed stands. Any difference in shade tolerance will be reflected in the relative response of regeneration to overwood density. As will be brought out, this point is of significance in Engelmann spruce- alpine fir silviculture.

Seed Production

Alpine fir is a better seed producer than Engelmann spruce. The fir begin bearing seed earlier in life, and produce heavy crops with considerable regularity although occasional total failures occur. For example, in 1950, research workers in the northern Rocky Mountains were unable to obtain any alpine fir cones for meeting seed exchange requests. Although Engelmann spruce bears fewer seed crops than alpine fir, it can still be rated as a good seed producer—better for example, than ponderosa pine and western white pine. It is likely to bear a heavy crop at intervals of 4 to 6 years and light or moderate crops in more than half of the intervening years.

Seedbed Requirements

Many investigators have studied the seedbed requirements for germination and initial establishment of spruce (*3*), (*5*), (*11*), (*12*), (*15*). They have shown consistently that bared mineral soil is decidedly superior to the natural forest floor. Under natural, undisturbed forest cover, rotten logs and stumps provide the principal surfaces upon which seedlings become established. Alpine fir reacts to seedbed conditions about the same as spruce (*13*).

Spruce seedlings can withstand exposure to light a little better than fir. Studies at the Rocky Mountain Forest and Range Experiment Station (*13*) showed better stocking of spruce after three growing seasons up to light intensities of about 50 percent of full shade. The following tabulation gives numbers of seedlings from an initial sowing of 600 viable seeds of each species under each light condition.

Percent shade	Engelmann spruce	Alpine fir
0	5	1
15	14	4
22½	17	6
30	15	7
45	38	16
60	77	97

The differences between species, although not great, are believed to account for the preponderance of spruce seedlings in natural openings in the spruce-fir type. Although comparatively heavy shade is desirable for the initial establishment of both species, the net effect is more favorable to fir than to spruce.

Windthrow Susceptibility

The spruce of the Rocky Mountains, like other spruces, is shallow rooted and subject to uprooting by severe winds, especially after thinning or selection cutting. Obviously, sensitivity to windthrow is highly important in connection with harvesting and stand improvement operations. However, considerable evidence has been accumulated within recent years to show that if sufficient skill and care are employed in timber marking, and if individual stands have been correctly judged in advance, losses among residual trees need not necessarily be disastrous or unbearably heavy.

In Canada, studies have shown that under some conditions, sufficient trees will stand up and grow to furnish a second cut in 30 to 50 years. For instance, deGrace has stated, ". . . blow-down on the east slope is practically negligible if a reasonable residual stand is left. . ." (*7*). This statement was based upon the discovery that mortality from all causes in partially cut stands on the areas studied averaged only 13.5 percent of the net annual growth.

The Rocky Mountain Forest Experiment Station has found, in a study in Colorado, that losses differ considerably in relation to the type of cutting (*14*).

Method of cutting	Total windfall losses per acre for first 4 years after cutting
	(board feet)
Group selection	205
Alternate strip cutting	401
Single tree selection	572

Losses from windthrow and other causes have been negligible in a spruce stand from which 75 percent of the volume was cut in 1927 on the Kaniksu National Forest in Northern Idaho (*9*). Judging from a brief inspection of the stand in 1952, total losses during the 25 years since cutting probably have not amounted to more than 5 or 10 percent of the reserve volume, and they have been far outweighed by subsequent growth of the reserve trees. This instance is exceptional, but it illustrates that sometimes spruce can withstand heavy cutting.

Insect Susceptibility

Susceptibility to devastating insect epidemics is an important silvical characteristic of Engelmann spruce. In recent years a bark beetle (*Dendroctonus engelmanni* Hopk.) has played as much or more havoc in Rocky Mountain spruce-fir stands than spruce budworm (*Cacoccia fumiferana* Clem.) and European spruce sawfly (*Gilpinca hercyniae* Htg.) have in the spruce-fir stands in the East.

Fortunately for spruce and alpine fir, the current heavy outbreaks of spruce budworm in the West have been directed chiefly toward Douglas-fir. The spruce beetle epidemic that raged in Colorado from 1941 to 1951 has been attributed to a heavy blow-down of spruce timber in June 1939. In spite of an intensive control project since 1950 in which about 1,000,000 trees have been treated on the fronts where threats were greatest, the ultimate probable kill could reach 12 billion board feet (*16*). As a result of the combined natural and artificial control, the epidemic seemed to be definitely declining in 1952, although over 10 billion board feet of green spruce remained in the vicinity.

A severe blow-down of spruce occurred in Montana and Idaho in November 1949. It has been followed by a rapid build-up of spruce beetles and in 1952 the attacks upon spruce, especially in northwestern Montana and the northernmost segment of Idaho are truly alarming. Localities have been found where 80 to 100 percent of the spruce have been attacked simultaneously. Preliminary surveys indicate that 30 percent attacks are common. The potential for an explosive epidemic appears to be greater than it was in Colorado at a comparable time after the blow-down which nourished the beetles during the beginning of the outbreak. The attack in Idaho, Montana, and Washington easily could spread to Canada if the beetles are not already on the increase there. The region within Idaho, Montana and eastern Washington contains over 9 billion board feet of spruce.

Quite aside from the tremendous economic losses caused directly by bark beetle epidemics, the outbreaks have yielded two significant silvicultural by-products. First is the lesson that the vast acreages of mature and overmature spruce in the Rocky Mountains are perishable and will not wait for leisurely development of roads and logging. Second, the epidemics are leaving large tracts without adequate sources of spruce seed, with the probability that alpine fir restocking will predominate.

Age-Class Structure

Western silviculturists disagree about the age-class structure of spruce-fir stands and its meaning in the development of silvicultural systems. In part, the disagreement results from actual differences in age-class structure. Some stands clearly are even-aged. Others have an even-aged overstory and a much younger advance reproduction understory. Some stands are many-aged or many-sized. We believe that although the spruce-fir type undoubtedly has the potential to form stable climax forest associations, the fact remains that most mature spruce stands do not have the age-class structure that one would expect to find in a fully developed climax forest where all age-classes from new seedlings to the ultimate in senility and decadence should be present.

The comparative scarcity of all-aged stands can easily be explained by a natural ecological agent—fire. Although moist, cool, spruce-fir forests do not normally carry fire readily, fires can and frequently have swept up into them from lower and more inflammable types during drought periods. Bloomberg has developed a theory of the fire history of spruce forests in considerable detail (*4*). The fine, mature spruce forests of the Rocky Mountains which have originated following catastrophic fires further demonstrate that economically desirable spruce forests can be grown in the pattern of even-aged silvicultural management.

Broadleaf Tree and Shrub Competitors

The absence of broadleaf trees in the western spruce-fir type will permit silviculture to develop along somewhat different lines from eastern silviculture. Unlike spruce-fir forests of the East, the Rocky Mountain spruce-fir type does not ordinarily contain an aggressive broadleaf tree element although certain minor portions of the Rocky Mountains support considerable stands of trembling aspen. Paper birch is widespread but is never aggressive in the spruce-fir type. Gray birch, yellow birch, and fire cherry do not exist in the region. Although the shrubs of Englemann spruce-alpine fir type grow densely, they are less of a problem than broadleaf trees and are easier to kill. The common shrubs include menziesia (*Menziesia ferruginea* Smith), alder (*Alnus* spp.), yew (*Taxus brevifolia* Nutt.), huckleberry (*Vaccinium* spp.), elderberry (*Sambucus* spp.), and devilsclub (*Echinopanax horridum* Dec. and Planch).

Silvicultural Practices

The foregoing discussion has described the principal biological and physical factors that govern spruce-fir silviculture. However, spruce-fir silviculture may have to be modified in some places by water resource management problems which

are of major importance in the Rocky Mountains.

Soils in the spruce-fir zone are generally unstable. Natural land slides and snow avalanches are not uncommon. The dense vegetational growth which binds the surface permits the soil to stand on steeper gradients than it would if it were less heavily clothed with trees and shrubs. The high precipitation of the zone both supports the vegetation and makes the soils unstable when vegetation is removed, or when the soil is displaced by road construction and logging.

Probably precipitation in the spruce-fir areas, chiefly in the form of snow, exceeds that in the mountain valleys by two to five times. Hence, in the West, where much value is attached to water for irrigation and power development, the public is becoming seriously concerned about the consequence of logging upon water resources. A strong probability exists that water management will control spruce-fir silviculture as much or more than production of timber.

Admittedly, business management aspects are highly important factors in spruce-fir silviculture. In the Rocky Mountain region, spruce-fir forests are today the least accessible and the most expensive to log. Hence, spruce logging operations have been more or less marginal ventures and usually only the larger and better quality trees have been removed. Most alpine fir, highly defective when overmature, is left. The first step in silviculture, therefore, has generally been to attempt to establish partial cutting, partly to prevent needless damage to residual trees, partly to preserve some of the more promising trees for further growth, and partly to maintain spruce seed sources.

British Columbia and Alberta

Silviculturists in the Canadian Rockies have carefully observed what happens to partially cut stands where all or a high percentage of the larger and more valuable trees have been removed in logging. Briefly, they have found that a great many spruce trees in the small sawlog and pole-size classes survive the shock of logging and accelerate substantially in growth (*7*). They also have found that the more aggressive seeding habits of alpine fir are partly nullified by inability of this species to survive and grow as well as spruce (*2*). Recently deGrace, Robinson, and Smith (*8*) of the British Columbia Forest Service have devised detailed marking rules that are based upon these principles of partial cutting. The rules advise the use of considerable judgment and flexibility by the timber markers, rating of the trees by thrift, leaving a substantial reserve, marking enough to make logging profitable, and reducing logging damage.

We believe that the new British Columbia marking rules represent a realistic compromise between silvicultural ideals and practical, present-day business management problems in that region. Forests which are marked and logged by these rules certainly will be left in a reasonably productive condition for the future.

Colorado

The Rocky Mountain Forest and Range Experiment Station has been experimenting with several methods of cutting in overmature timber in Colorado since 1944. All of their cuts have involved removal of 60 percent of the volume, but three different methods have been employed: (1) straight risk marking or single-tree selection, (2) alternate clear-cut strips 66 feet in width with a 10-percent risk cut in the reserve, and (3) group-selection or small circular clear-cuts with a 10-percent risk cut in the reserve. Their findings, although still preliminary, point to considerable advantages for the group-selection and strip cutting methods (*11*). First, windthrow losses have been lower. But much more important to silviculturists, to whom control of regeneration is the foremost responsibility, reproduction can be managed much better in the openings which strip and group cuttings create. Slash, unwanted alpine fir advance growth, and seedbeds can be treated as the situation requires. Full advantage can be taken of modern machinery such as crawler tractors with slash-piler blades. Light conditions favor spruce more than fir.

The Rocky Mountain Station investigations, like the studies in British Columbia, have pointed to the need for a great deal of flexibility in silvicultural practices. As a result, a system has been proposed which divides merchantable spruce-fir forests of Colorado into 16 condition classes. Each condition class presumably requires a prescription for harvesting, slash disposal, and regenerating. The station also is studying wind movement as an important influence for deciding how to arrange reserve strips and groups to lessen windthrow.

Idaho, Montana, and Northeastern Washington

In the northern Rocky Mountain portion of the United States, recent proposals for management of spruce-fir have followed lines similar in principle to those in Colorado, but strikingly different in certain points of application. In western Montana and Idaho, D-8 and TD-18 crawler tractors and modified high-lead, portable skidding jammers have entirely displaced horses and small tractors. They seem to be here to stay until either bigger machines or radically different logging methods are devised. Most timber is being skidded in tree lengths. Furthermore, chain saw felling usually causes more injury to the reserve and poorer positioning of the felled trees. With these logging methods in vogue, selection cutting, either single-tree or group, results in severe injury to the reserve trees on the typical steep slopes. However, we do not believe that selection cutting which leads to uneven-aged stand management is the best long-time silvicultural system for our spruce-fir type. Hence, foresters who agree with this viewpoint have not attempted to control logging damage as much as they have attempted to work out silvicultural methods which take advantage of the logging methods.

Many western foresters know from examination of present stands and from study of stand history that spruce-fir can grow well and produce high quality timber in an even-aged condition. They know that increasingly heavy shade favors alpine fir. They have convincing reasons to believe that future rotations will be much shorter than the natural pathological rotations. The long pathological rotation favors spruce over fir. The shorter economic rotations will favor fir over spruce, and this must be offset by positive measures to encourage spruce. Many foresters are convinced that spruce is a better tree than fir to grow as the principal crop and think it is worth spending some money to increase the proportion of spruce in the stands.

U. S. Forest Service Photo

FIG. 3.—A clear-cut block on the Flathead National Forest, Montana. This area will be broadcast burned to remove the logging slash, kill competing shrubs, and prepare a mineral seedbed.

The harvesting and regeneration methods which are being contemplated in Idaho and Montana have not been fully developed in all details and no doubt many modifications will be introduced. Much research will be needed but the general principles and major steps seem to be clear. Briefly, the general proposals are to clear-cut in comparatively large blocks of around 40 acres, and then take such measures as are necessary to restock the clear cuttings promptly with spruce. The blocks will not be arranged in a regular geometric pattern. They will be located to provide for wind-firm or protected edges, to take out the higher risk timber units first, and to conform with the needs of efficient logging and road design. (Fig. 3.)

Slash disposal and regeneration methods in large clear cut blocks should be varied to fit the needs for protection and restocking. If there is a dense shrub undergrowth, perhaps in some instances the slash should be broadcast burned to help eliminate the vegetation which inhibits reproduction. Crawler tractors equipped with either earth-moving blades or special brush rakes have already been proven to be capable of efficiently piling slash and scarifying the forest floor. Airplane or helicopter spraying with herbicides possibly may also be employed as a means for destroying undergrowth. In recent years, helicopters have been successfully used to kill brush in north Idaho at a surprisingly low cost. For example, in 1951, over 1,000 acres were sprayed at a total cost of only $8.68 per acre for machine rental, materials, and supervision (*10*). Hence, several methods can be visualized as means for seedbed preparation. Some will have considerable desirable advance growth. Some will receive sufficient scarifying from the usual logging processes.

Where advance spruce reproduction is insufficient, both natural reseeding and artificial reforestation may play a part in regeneration. The major portions of the clear cut blocks should be within reasonable range of natural seed scatter. More studies of seed production and distribution, and the effects of air currents in mountainous terrain are needed to work out methods for making most effective use of natural seed fall.

Our advocacy of clear cutting as the final step in harvesting mature timber and renewing the forest should not be understood to be our sole silvicultural prescription. We recognize that some stands, especially the younger and thriftier stands, can be benefited by intermediate harvesting operations that will prolong stand vigor and increase the yields. But these should not be confused with selection cutting. In the future, we foresee commercial thinnings as a normal phase of silvicultural management, and an important step in salvaging the alpine fir while it is still sound. Furthermore, when stands are found which are many-aged, we are quite willing to advise a selection system of management. However, we believe that generally even-aged management will yield a higher proportion of the better quality products.

Summary

The spruce-fir forests of the Rocky Mountain region are highly variable in composition, but the silvical characteristics of the type species discussed in detail, are not unlike those for the counterpart species of the eastern spruce-fir forests.

Silvicultural practices vary somewhat regionally in the West and are modified by such important considerations as watershed management requirements and local economic considerations. Regionally, the following silvicultural practices are recommended for the spruce-fir forests of the West:

1. For British Columbia and

Alberta, Canada: A selection system that recognizes the need for flexibility in marking, rating of trees by thrift, leaving a substantial reserve and reducing logging damage.

2. For Colorado: Recognition of the great need for flexibility in silviculture has led to the development of 16 condition classes, each one of which has prescribed harvesting, slash disposal, and regeneration features.

3. For Idaho, Montana, and northeastern Washington: Clearcutting in comparatively large blocks of about 40 acres, arranging blocks to reduce windthrow susceptibility, controlling shrubs and scarifying seedbed as necessary, and planting or direct seeding if natural regeneration is not adequate.

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Forest and Shelterbelt Planting in the United States During 1952[1]

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1952 set a new record for forest and shelterbelt planting. During this year (July 1, 1951 to June 30, 1952) the state foresters and other reporting agencies reported at total of 522,935 acres planted; an increase of 66,567 acres (15 percent) over the 1951 figure; and 3,894 acres above the previous record set in 1940. The year's accomplishment by ownership classes is as follows:

The federal government planted almost 2,800 acres more of its own land than it did in 1951—an increase of 5 percent above 1951.

The states and other public agencies (non-federal) planted almost 18,800 acres more of their land—an increase of 43 percent above 1951.

The private landowners planted nearly 44,900 acres more of their land—an increase of approximately 12 percent above 1951.

In six states private land planting decreased about 29,000 acres, mostly for want of planting stock, rather than for want of the wish to plant.

In 17 States private land planting did not vary 200 acres up or down from the previous year.

In 27 States private land planting increased a total of 73,000 acres from last year.

THE NATION is now planting at its pre-war rate. Planting during 1950-51-52 totalled 1,477,000 acres and during 1939-40-41 totalled 1,474,000 acres There are, however, two important differences between these apparently similar figures.

One of the differences is that the current effort is largely by private owners planting their own lands. Seventy-nine percent of the land planted during the past three years is privately owned and 21 percent is government (federal, state, local) owned, whereas in the three years before the War the proportion was 49 percent private and 51 percent government. Of course, in considering these figures one must bear in mind that they tell the story according to land *ownership*, rather than by dollars spent, for actually the state and federal governments, or both, have a considerable cash investment in private planting. Currently that investment is made through the C-M 4, ACP, and other programs; formerly it was made through the CCC, WPA, Shelterbelt and similar programs. On a cost basis therefore the proportion of government-private participation is somewhat different than the above cited figures, but that does not alter the main fact that today the private owners are our principal force for tree planting. We consider this to be a most encouraging situation.

The other point to be remembered when looking at the figures for the nation as a whole is that tree planting is booming at record rates *in only a few states*—notably in the South; in far too many of the other states the record ranges for discouraging to actually bad. In eight states there has been an actual reduction of private land planting and no current action is planned for a return to the previous level, inadequate as even that may have been. In six others there has also been a reduction but its correction is imminent. In perhaps 10 states tree planting continues at about the level of many years ago, while still another group of states has experienced a rate of increase which is inadequate to say the least. The great upsurge, therefore, looks better than it is for it is a localized gain with many of the states needing a vigorous program but making little or no headway towards it.

The table which follows contains some columns for the private land planted . (Private acres planted). These show the unevenness of the current work. The states which are leading are four — Georgia with 49,000 acres; Louisiana with 35,000 acres; Mississippi with 31,000 acres; and New York with 30,500 acres. Thus Georgia led all of the states in 1952 — in fact it planted almost twice as much private land as did 36 of the others all combined. Five other states — Florida, Michigan, Arkansas, Alabama and South Carolina accounted for 101,000 private acres between them. These nine high states are followed by 15 states which had programs that could be rated "average" by current standards. They planted 133,000 privately owned acres between them. At the bottom of the scale are the 26 states whose private land planting was so meagre that combined they totalled less than 25,500 acres, or stated another way — the private land planted in 26 states combined amounted to only 6 percent of the nation's private land planting.

It is to be noted that seven of the nine leaders are in the South. The recent increase of private land planting in the 13 southern states is so remarkable that it deserves special mention. To illustrate—in 1940 the total planting for the nation by all government and private agencies was 519,000 acres of which the private land owners of the 13 southern states planted 23 percent or 119,000 acres. In 1952 the total national figure is 523,000 acres, of which the southern private land owners accounted for 45 percent or 236,000 acres. Private land planting in the South has increased so greatly in the last few years that it is sufficient to balance the decrease that has occurred since 1941 in planting by government agencies and 14 other states.

Future Outlook

As this report is written some early figures for the 1953 season, and the financial plans for the 1954 season are at hand. They forecast a new planting record, partly from further expansion in the South and to a lesser extent from expansion in a few of the other states. Before the end of F.Y. 1953, one southern state will complete nursery construction for a 100 million tree an-

[1]Compiled from information furnished by the state foresters or other appropriate public officials of each state and federal agency concerned.

TABLE 1.—SUMMARY OF ALL ACRES PLANTED IN 1952
JULY 1, 1951—JUNE 30, 1952

State	Federal acres planted			Other public (non-federal) acres planted			Private acres planted			Grand total		
	Current year	Previous years	Total	Current year	Previous years	Total	Current year	Previous years	Total	Current year[1]	Previous year[1]	Total year[1]
Alabama	1,005	64,439	65,444	104	3,125	3,229	16,037	96,935	112,972	17,146	164,499	181,645
Arizona	882	5,116	5,998	—	—	—	100	1,344	1,444	982	6,460	7,442
Arkansas	402	19,661	20,063	400	112	512	19,250	48,225	67,475	20,052	67,998	88,050
California	6,791	37,195	43,986	45	17	62	226	36,785	37,011	7,062	73,997	81,059
Colorado	460	68,349	68,809	20	44	64	1,038	20,384	21,422	1,518	88,777	90,295
Connecticut	—	650	650	89	14,150	14,239	784	23,406	24,190	873	38,206	39,079
Delaware	—	100	100	10	567	577	132	1,651	1,783	142	2,318	2,460
Florida	505	27,626	28,131	970	4,684	5,654	27,603	223,143	250,746	29,078	255,453	284,531
Georgia	545	10,279	10,824	289	5,697	5,986	49,504	290,944	340,448	50,338	306,920	357,258
Hawaii	—	—	—	472	35,090	35,562	191	61,101	61,202	663	96,191	96,854
Idaho	1,667	96,835	98,502	53	519	572	480	7,697	8,177	2,200	105,051	107,251
Illinois	990	37,518	38,508	1,460	7,170	8,630	5,348	44,412	49,760	7,798	89,100	96,898
Indiana	539	16,101	16,640	658	19,578	20,236	5,458	50,680	56,138	6,655	86,359	93,014
Iowa	8	142	150	189	6,970	7,159	251	260,726	260,977	448	267,838	268,286
Kansas	—	100	100		560	560	1,800	218,279	220,079	1,800	218,939	220,739
Kentucky	167	10,570	10,737	280	1,021	1,301	2,060	16,616	18,676	2,507	28,207	30,714
Louisiana	381	103,419	103,800	1,135	6,433	7,568	35,224	220,764	255,988	36,740	330,616	367,356
Maine	—	401	401	142	993	1,135	1,001	17,796	18,797	1,143	19,190	20,333
Maryland	—	1,431	1,431	367	3,086	3,453	2,524	23,408	25,932	2,891	27,925	30,816
Massachusetts	—	—	—	174	61,303	61,477	732	33,564	34,296	906	94,867	95,773
Michigan	5,763	536,121	541,884	7,765	300,159	307,924	22,959	101,915	124,874	36,487	938,195	974,682
Minnesota	2,115	131,597	133,712	4,514	47,693	52,207	5,751	100,152	105,903	12,380	279,442	291,822
Mississippi	2,896	136,607	139,503	113	3,144	3,257	31,205	110,798	142,003	34,214	250,549	284,763
Missouri	2,511	55,245	57,756	204	3,851	4,055	1,263	17,384	18,647	3,978	76,480	80,458
Montana	754	34,576	35,330	7	—	7	738	10,931	11,669	1,499	45,507	47,006
Nebraska	141	30,631	30,772	—	1,446	1,446	7,895	283,653	291,548	8,036	315,730	323,766
Nevada	12	63	75	—	—	—	45	292	337	57	355	412
New Hampshire	—	1,153	1,153	44	12,310	12,354	421	25,067	25,488	465	38,530	38,995
New Jersey	—	—	—	82	13,449	13,531	1,572	25,312	26,884	1,654	38,761	40,415
New Mexico	129	4,570	4,699	—	—	—	268	1,825	2,093	397	6,395	6,792
New York	20	5,183	5,203	10,771	485,057	495,828	30,425	314,211	344,636	41,216	804,451	845,667
North Carolina	709	15,304	16,013	423	3,723	4,146	11,716	61,890	73,606	12,848	80,917	93,765
North Dakota	—	2,447	2,447	2	307	309	8,500	65,798	74,298	8,502	68,552	77,054
Ohio	483	11,924	12,407	1,908	27,042	28,950	11,203	89,291	100,494	13,594	128,257	141,851
Oklahoma	—	5,202	5,202	76	383	459	3,950	82,849	86,799	4,026	88,434	92,460
Oregon	11,561	62,242	73,803	17,627	33,210	50,837	12,070	46,566	58,636	41,258	142,018	183,276
Pennsylvania	75	20,888	20,963	1,913	81,754	83,667	13,670	219,342	233,012	15,658	321,984	337,642
Puerto Rico	179	11,373	11,552	1,534	19,051	20,585	1,600	55,863	57,463	3,313	86,287	89,600
Rhode Island	—	403	403	67	10,775	10,842	347	20,490	20,837	414	31,668	32,082
South Carolina	1,169	31,815	32,984	306	15,709	16,015	15,210	169,233	184,443	16,685	216,757	233,442
South Dakota	577	29,656	30,233	142	2,221	2,363	6,240	77,059	83,299	6,959	108,936	115,895
Tennessee	1,074	53,231	54,305	458	22,855	23,313	8,736	158,083	166,819	10,268	234,169	244,437
Texas	185	49,669	49,854	93	2,802	2,895	10,978	104,705	115,683	11,256	157,176	168,432
Utah	52	3,996	4,048	19	48	67	191	1,768	1,959	262	5,812	6,074
Vermont	32	1,275	1,307	45	7,260	7,305	1,285	22,922	24,207	1,362	31,457	32,819
Virginia	152	5,817	5,969	375	2,512	2,887	7,161	29,189	36,350	7,688	37,518	45,206
Washington	6,165	92,603	98,768	2,149	37,399	39,548	6,043	80,550	86,593	14,357	210,552	224,909
West Virginia	119	16,083	16,202	32	2,815	2,847	1,700	20,239	21,939	1,851	39,137	40,988
Wisconsin	2,193	229,277	231,470	5,249	174,438	179,687	12,721	148,793	161,514	20,163	552,508	572,671
Wyoming	420	6,560	6,980	2	136	138	724	5,303	6,027	1,146	11,999	13,145
Total	53,828	2,085,443	2,139,271	62,777	1,482,668	1,545,445	406,330	4,149,333	4,555,663	522,935	7,717,444	8,240,379

Includes acres of planting by direct seeding, both aerial and hand methods.

nual output, after which it will give serious consideration to increasing this further. Several other states in the South expect to achieve 100 million outputs in just a few years and still others are talking of increasing to 50 million capacity. In addition to the increased capacity being installed by the states there are a number of forest industry companies in the South that are installing their own nurseries. No one can say what the ultimate forest nursery capacity for the nation will be but it appears likely that in the near future it will exceed ¾ of a billion trees annually. Although most of this will be in the South there will be a considerable increase in most of the other states, a few of which are definitely working for 40 million and 50 million annual capacities.

All in all, therefore, an annual planting of 750,000 acres seems likely within the next few years. This will be an encouraging milestone to reach but will still be far from adequate in view of the estimated 62,000,000 acres or more of private land which need planting in our nation.

Reforestation by Direct Seeding

The table which accompanies this narrative includes some acreage for reforestation by direct seeding. Success by direct seeding is not yet assured, but sufficient success has been experienced to justify the work. Considerable research is being done in area preparation, seeding rates, climatological factors, and much else. The success of direct seeding is earnestly sought since vast areas exist on which hand planting is so costly that their restoration is currently impractical.

Other Advances

The past year saw a steady growth of all of the things that contribute to an increased tree planting program. Research and acceptance for new nursery techniques continued, more tree planting machines were put into the field, efforts to teach planting and start planting went on with continued vigor. No single item or place need be mentioned—it is enough to say that generally the work went on well; and disappointments, while they occured, were not crippling to most states' long range programs.

Administrative Practices on Private Commercial Forest Lands

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THE ADMINISTRATION of enterprises of all kinds, especially large enterprises, is receiving increasing attention today. There are several reasons for this. The need for greater production, for increased technical knowledge, for more expensive equipment, and, partly as a result of the foregoing, the need for larger capitalization frequently make large organizations more efficient than small ones. But this can be true of the large organization only if the people who make it up are working together effectively with a minimum of discomfort and friction. Otherwise the enterprise may fail completely to achieve its objectives. "The realization that the American worker participates in production, not because of compulsion, not in proportion to an hourly wage wrung by union negotiators from a reluctant management, but in proportion as his work has meaning to him, is bringing about a second Industrial Revolution." (*TIME*, April 14, 1952) This revolution has not yet affected some parts of the woods industries. Taking an example from eastern Canada, E. R. Complin, writing in the *Woodlands Review*, May, 1952, ventures a guess that conditions in woods camps have not changed much since the days when the foreman was known to be physically capable of dominating any man in his crew. Should these conditions result in failure of such a large enterprise to perform its functions in our economy, it would be extremely serious from the standpoint of capital, employment, and resources.

Foresters will occupy positions of increasing importance in the administration of woods enterprises. If the forestry schools can help to avert failures by instilling in graduates a knowledge of the basic principles of administration, it is their responsibility to do so. Forestry is still new as a business enterprise in this country. The importance of scientific administration was recognized from the start in public forestry, and much has been published on organization and management. It has been pointed out repeatedly that forestry graduates need more knowledge of administration. Part of this is knowledge of how people of various capabilities are organized to carry out the objectives of a whole agency or company. It has been necessary in the past to draw largely upon the experience and practices of Federal agencies for this. With the thought that large-scale private forestry has now accumulated considerable administrative experience, questionnaires were sent to large forest owners in major regions of the United States. The viewpoint was that of determining what administrative practices are followed; not whether practices are good or bad from the standpoint of national policy.

One hundred twenty-three questionnaires were mailed in January, 1952. Altogether 62 replies were received, of which 58 contained sufficient data to be used in the survey. The 58 companies reply-

ing own a total of 19.1 million acres of forest land. All but three, who are primarily sellers of standing timber, are operating companies. Their annual requirements total 9.4 million cords of pulpwood and 2.4 billion board feet of sawlogs, veneer logs, poles, and mine timber. The annual production from their own lands is 2.5 million cords of pulpwood and 2.1 billion board feet of sawtimber and other products. These data open a whole realm of interesting economic speculation as to advantages of controlling the raw material supply. It is significant that production from owned land of a large portion of material needed to supply mills or plants offers greater opportunity for intensive management of timberlands. This fact certainly places a different emphasis on wood procurement activities. Six holdings are in the medium size class (5,000 to 50,000 acres, U. S. Forest Service reappraisal). Of the large ownerships (over 50,000 acres), 9 are in the Northwest, 19 in the South, 7 in the Lake or Central States, and 17 in the West.

The official in charge of forestry work is designated by 24 companies as chief forester (or similar title, indicating that he heads a recognized division or department) and by 18 as forester. In 15 companies this work is placed directly under a woodlands manager, wood procurement or general superintendent. The data obtained were not sufficient to reveal any consistent relation between the title and administrative responsibilities as measured by number of persons supervised, number of employees engaged chiefly in forestry work, or amount of production from owned land. They likewise failed to reveal any relation between title and authority to determine the amount, location, and method of timber cutting. However, 45 companies stated that the man in charge of forestry work has this authority. The forestry official reports to the logging manager in three companies; to a woodlands or resident manager in 13; to a general or branch manager, executive vice-president, or other high-echelon officer in 41 companies. In most cases, heads of from one to 6 other departments, such as logging, wood procurement, yard, boom, plant, sales, and office, report to this same high official. Thus forestry appears to be recognized as one of the major activities of these companies.

The same official is placed in charge of both forestry and logging activities by 5 companies, and the forester reports to the logging manager in three firms. These three appear to be companies in which logging and forest management are closely integrated, rather than companies that subordinate forestry to the requirements of the logging operation. Where the forester is under the logging official or is the same man, the higher officials must have a strong forestry attitude if forestry is not to be so subordinated. But in three cases, the logging boss is under the forester. In 23 companies, logging is in charge of a superintendent or manager on an equal footing with the forester. In other cases this information was not given, possibly because logging is done by contractors rather than directly by the company. Two replies stated that contractors are supervised by the land manager or agent.

The forestry official is responsible for the supervision, either directly or through subordinates, of an average of 49 persons year-long and 39 persons seasonally employed. This is on the basis of 55 replies as to year-long personnel. The number of seasonal personnel was based on the same number of replies, although 17 did not indicate any seasonal employees. Extremely wide variations among companies are due to the fact that some place loggers under the forestry official, while others do not. Furthermore companies differ in size, scope of forestry activities, and seasonal operation. However it is assumed that the figures do represent the average work load of the forestry officials in this respect. A large number of seasonal employees would add to this work load through increased recruiting and training requirements. The average number of persons supervised by each principal subordinate of the forestry official was given by 50 companies as 9.8 persons.

Fourteen companies indicated that the men on the next administrative level below the chief forester are organized on a territorial basis. Of these, seven have a functional staff in addition to subordinates in the chain of command. On the other hand, 40 companies organize this level on a functional basis. Some variation is to be expected, since the forester has operational responsibilities in some companies, while in others his relation to the operating boss is that of a technical staff.

The companies were queried as to 22 types of work performed by foresters. More than 50 said that their foresters acquire land; prepare timber management plans; cruise and mark timber; handle stumpage sales; and protect forests against fire, insects, disease, and trespass. Between 40 and 50 listed land surveys and road locations as responsibilities of the forestry departments. Between 30 and 40 listed timber harvesting; purchase of logs, pulpwood, or stumpage; and leasing of cabin sites or other company land. Between 20 and 30 listed road construction and maintenance, operation of communications systems, administration of recreation, and control of grazing. The foresters handling grazing are mostly in the South, but not exclusively so.

Each company was asked to show the extent to which forestry is an autonomous administrative division of its organization. This was indicated by the checks against the activities listed in item 16 of the questionnaire. Numbers in parentheses refer to numbering of activities in item 16. No one of these is carried on by as many as 50 of the companies replying. Between 40 and 50 indicated that their forestry departments (1) select and recruit personnel, (2) transfer and promote personnel, (4) have automotive and heavy equipment for their own use, (6) carry on public relations work, and (7) handle relations with other companies and

with public and private forestry organizations. Between 20 and 30 forestry departments also (3) prepare payroll vouchers and personnel reports and (5) have an independent departmental budget.

Fifty-six companies employ 659 forestry school graduates. The purpose of the questionnaire was not primarily to determine the number of jobs available for graduates, although it has been suggested that this might well be the object of a survey. Rather it was to determine the extent to which employers consider college training essential. All of the forestry graduates on the payrolls may not be engaged in forestry work. However, some forestry work is done by nongraduates, and the total number of men doing chiefly forestry work was given as 826. Applying the latter figure to the total forest land owned, we get one forester for every 23,408 acres. This is remarkably close to Herbert's forecast of one forester for every township.[1] These lands are probably among the most intensively managed forest lands in the country.

The amount budgeted annually for forestry work, including salaries and costs for protecting the crop, improving production, and for permanent development, but excluding taxes and logging costs, was given by 38 firms as $4.8 million. Since these same companies own 12 million acres of forest land, they are spending almost exactly 40 cents per acre. The indicated expenditure for forestry does not include complete land costs, since taxes were excluded. The basis on which the forestry budget is set up, as indicated by 48 replies, can be most nearly described by the phrase "cost of customary activities plus those considered desirable." This seems to indicate that the forestry official must make a case with top management for the funds desired for forestry work. But a few checked some other phrase, such as "share of profit of manufacturing plant," "allowance per acre of forest land owned," or "excess of delivered wood value over logging costs."

Twenty-six companies said they have a training program for other than fire fighters. This indicates that officials are alive to the opportunities for improving performance of individuals and of the entire organization through training, instead of relying exclusively upon experience and prior education of personnel.

Nineteen companies stated a program exists for developing permanent communities or employing subsistence farmers. The very existence of a permanent management unit, of course, provides a degree of stability to nearby communities. If a conscious effort is made to influence existing communities or to establish new ones, social planning is added to the forester's responsibilities. Limitations of the questionnaire prevented an analysis of what is being done.

The companies were asked about assistance furnished to small forest owners from whom stumpage, logs, or pulpwood are purchased. The survey was not concerned with whether such assistance is or should be available, but whether it is an administrative problem making demands upon the time and skill of foresters and upon the operating budgets of the companies. The amount of assistance furnished other owners might affect the average forestry expenditure per acre and the area served by each forester as indicated earlier in this report, since the questionnaire did not provide for segregating expenditures on owned and on other lands. Replies of 27 companies stated that advice is given, and three others give technical assistance. In four cases cruising is done; in 21 marking; two help prepare management plans; three (all in the South) mention fire protection; five give financial or marketing help. Presumably the last group includes more than the purchasing of products. Other forms of help include use of equipment, distribution of planting stock, and location of land lines.

Those companies who cooperated in the survey gave some very valuable information, and a high percentage of returns was obtained. The questionnaire method has very definite limitations. Even with a high return and all questions completed, there may be errors of interpretation both in answering the questions and in compiling the results. The data obtained were not sufficient to permit comparisons between regions or between sizes of operations, which would have been interesting, or between lumber and pulp companies, which will become less significant as forest utilization becomes more integrated. Average figures cover such diverse conditions as to be valuable only for indicating trends and general conditions. Greater refinement would require much more time and travel, probably a combination of questionnaire and field study, and might have to be undertaken on a regional basis. The present study served the purposes of establishing that private forest administration has made great progress, and of strengthening the base for student training in forest administration at the University of Maine.

[1] Herbert, P. A., Are we set up to train too many professional foresters? Proc. Soc. American Foresters. Boston 1948.

Change and the Journal of Forestry

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REGARDLESS of its reason for existence, the JOURNAL OF FORESTRY is a magazine. For a magazine to accomplish its mission, it must first be read. Beyond that point magazines differ. Some are meant to perform the sole function of entertaining the reader; others to entertain and inform; others simply to inform. Magazines which are called "journals" or "official organs" are usually published for the benefit of a specific group of readers who have some common interest or goal. These readers do not seek entertainment. They seek information which will further the interests shared by the group or promote the common objectives which the group represents.

The Purpose of the Journal

The JOURNAL OF FORESTRY is the official organ of the Society of American Foresters, an organization representing the profession of forestry in the United States. As such, its first purpose is to forward the stated objectives of that Society, to: "represent, advance and protect the interests and standards of the profession of forestry; provide a medium for exchange of professional thought; and promote the science, practice and standards of forestry in America."

The JOURNAL is by no means the sole activity undertaken by the Society to further these objectives, but it is the one most obvious and most regularly seen by the casual observer.

The manner in which the JOURNAL undertakes to carry out its purpose is controlled by the limitations and opportunities inherent in a magazine and by the policies which have been evolved or adopted for its guidance.

In the process, as a magazine, the JOURNAL must be attractive to the reader in order to secure his attention; interest him in order to hold his attention; and inform him so as to be worth his attention.

In the process, also, the JOURNAL must assume additional responsibilities that arise out of both the fact that it is a magazine and that it is a magazine with a specific purpose. It has a responsibility to its individual readers and a responsibility to itself. The nature of the first is obvious, that of the second, intangible but no less real. Like a man, the magazine must have self respect and integrity. It must have reasonable freedom of choice as to how to go about performing its duties, the wisdom to listen to advice, but the strength of character to make up its own mind.

The Journal and the Profession

These are not tranquil times. The airwaves crackle with world reports of events and counter events, with fearful voices and confident voices. In the Nation's capitol there are changes and rumors of changes while the people of America try to fulfill their place of leadership in the world-neighborhood and keep their own house in order at the same time. Foresters find themselves increasingly drawn into the problems of government, business and society in general.

The profession enters the first years of its second half century to undertake important tasks by reason of training, ability and public respect. It finds itself a dynamic and rapidly growing profession. Everyday its storehouse of technical knowledge increases, its field of interests widens. In such a situation the JOURNAL is not faced with the question of whether or not it should grow and change. The question, rather, is what the nature of those changes should be in order that the growth be quality increment. It has changed in the past; it must continue to change, or default in its task.

The last decade or so has seen significant developments in the profession. It has almost doubled in numbers in that time, and acquired a large proportion of younger men. There has been a marked shift in employment into the fields of industrial and private work. Heavier and broader responsibilities have been assumed by foresters as their profession gained the confidence of employers and the public. The JOURNAL goes out to over 9,000 professional men who are engaged in widely varying activities and who possess a multitude of interests and a multitude of opinions.

The common bond among these men is their professional interest. They are professional men first, employees of an employer second. Within the definition of what constitutes the bounds of that profession lies the legitimate scope of the JOURNAL's activity. It should not be its function to "provide a medium for exchange of" thought other than in the professional field, nor to "promote" other than "the science, practice and standards of forestry in America."

The definition of the limits of genuinely professional interests constitutes the problem. You would not, for instance, expect a journal of the medical profession to devote much space to the comparative value of various automobiles simply because the doctor transports himself by car when making his rounds. But transportation is a major item in the job of some foresters. You would not, on the other hand, expect the medical journal to limit itself to the techniques of abdominal operations. The doctor needs to be informed about other things also.

In taking stock of itself, the JOURNAL must ask if it is properly serving the profession by the publication of information which the profession as a whole needs and wants.

In the light of professional growth and of reader comments, the major question has seemed to be whether the JOURNAL is growing with the profession or whether it is concerning itself with watching the club instead of the ball.

Who could answer such a question except the reader? The JOURNAL undertook to seek his advice.

Reader Opinion

A questionnaire was sent to members of the Society along with notification of their dues for the current year. Two questions about the JOURNAL were included. They sought to determine whether the present make-up and departmental emphasis was in accord with reader interest, and whether subject matter was in accord with the kind of information readers desired.

Briefly, the answers indicate that for the average reader the answer to the first is a general *Yes*, to the second a qualified *No*.

Preferences by first choice of JOURNAL departments were tabulated on the basis of the employment classification of the reader: Industry; Federal Government; State, County and Municipal Government; Education; Self-Employment; and Other. (Table 1).

The variation in order of preference for the eight JOURNAL departments was minor. All employment groups emphatically agreed on first choice, Articles; second choice, News; and third choice, Notes. The two major groups, Industry and Federal, who comprise over 60 percent of the readers, agreed on their classification of all eight departments in the following order of preference: Articles, News, Notes, Society Affairs, Points of View, Reviews, We Present, and Advertising. A few minor variations from the total pattern occurred in the last five preferences listed. They are interesting but because of their slight emphasis, not particularly significant (Table 1).

Two assumptions can be drawn from this. Articles are definitely the first interest of the readers. The fact that about half of each issue is devoted to articles of a professional and scientific nature, and that the readers emphatically list this as the department of their primary interest, indicates general agreement on the primary mission of the JOURNAL.

Secondly, foresters want to read the news about foresters and forestry events in the magazine. Such definite interest was not altogether expected. Much needs to be done before that department can be defined as alive, timely and significant. Sources of news are at present pretty well limited by the time which the editor has to devote to the perusal of releases and publications which cross his desk. Very few items are submitted by readers on the spot where news is in the process of happening. The desire for greater emphasis on this department is indicated. This need not necessarily mean more space; it does mean more significance and timeliness.

Having undertaken to determine what attracts and interests readers in the JOURNAL, the staff asked a second question to determine what kind of information the professional reader wanted. The opinion has been rather widely expressed that the magazine has been of too highly technical[1] a nature to be of practical value to the average reader. Furthermore, consideration of developments in the profession might lead one to conclude that it is passing out of the stage of primary concern with techniques and is becoming increasingly concerned with the application of those techniques. Also, foresters have always been mindful not only of the techniques of forestry but of the place of forestry in American government, business and society.

Readers were therefore asked to indicate whether or not they would like to see the articles in the JOURNAL of a more — or a less — technical nature. Four choices were offered. In the process of tabulation, however, it was found that the positive answers outweighed the negative at about the rate of two to one. In other words, two people indicated, "I *would* like to see the JOURNAL of a *less* technical *nature*" to every one who indicated, "I *would not* like to see the JOURNAL of a *more* technical nature." For the sake of simplicity and emphasis of meaning the four choices were combined into two in Table 2. (The tabulation, therefore, is meant to indicate the trend of opinion rather than an exact numerical weight. The latter can be secured by reducing by one-third the total percentage figure for the "More Technical" and the "Less Technical" columns and applying the third of each as a rather indefinite addition to the "as is" column.)

There is in the second question, also, rather striking similarity of opinion, except for a marked departure from the majority opinion by foresters in the educational field.

The conclusion is drawn that out of every 100 readers of the JOURNAL the following opinions exist:

[1] *Webster*. "Technical. Also Technic. 1. Of or pertaining to the useful or mechanic arts, or to practice, method, procedure, etc., in any science, business, profession . . . as technical training or skill. 2. Peculiar to or used only in a particular trade, profession, science, art, etc.; highly specialized."

TABLE 1.—READING PREFERENCE FOR JOURNAL DEPARTMENTS

Rating of departments by indicated first preference

Employment classification	S.A.F. Membership[1]	Articles	Notes	We Pres.	Pts. View	Reviews	Soc. Aff.	News	Adv.	No preference
					Percent[2]					
Industry	30	49	8	1	3	1	4	22	1	11
Federal	30	58	8	2	2	2	4	18	1	8
State	14	52	8	0	2	3	4	23	1	8
Education	5	61	8	0	4	2	5	11	2	7
Self-employed	5	46	6	0	3	2	6	18	0	18
Other	2	42	8	1	2	4	2	27	2	11
Not tabulated[3]	14	—	—	—	—	—	—	—	—	—

[1] Basis 4,281.
[2] To nearest figure.
[3] Armed forces, students, retired, not classified.

6 men want no changes made in the character or the subject matter of the article department;
8 men do not want to see it become less technical;
12 men do not care whether any change is made or not;
16 men would definitely like to see the department of a more technical nature;
19 men would not;
38 men would definitely like to see the article department become less technical in character.

As could be expected, foresters in industrial work most emphatically of any group voted for "Less Technical." They represent 30 percent of the JOURNAL's readers and their opinion is agreed with, although somewhat less definitely, by all other groups except the men in education. The latter make up slightly less than 5 percent of the membership. On the other hand, the opinion of the educators must be given more weight than their numbers warrant, for we look to the educators for leadership in professional thought and in professional training.

The Silent Men

The percentage return on the questionnaire is quite good, representing approximately four-ninths of the possible total. But what of the other 5,000 members of the profession who receive the JOURNAL but whose opinions are not included in the foregoing? Is it that they have no opinion or is it that they do not read the JOURNAL? To acquire as readers those who do not now read might be of greater importance than attempting to entirely satisfy the wishes of those who now read. Does the majority opinion of the non-readers parallel that of the readers but exceed it in strength to the point that they toss the JOURNAL in the corner when it arrives? If so, for what reasons? Because they find it of no practical application to their work?

TABLE 2.—PREFERENCE REGARDING TECHNICAL NATURE OF JOURNAL ARTICLES

Employment classification	S.A.F. Membership[1]	More Technical	Less Technical	As Is	No Preference
			Percent[2]		
Industry	30	21	62	4	13
Federal	30	27	54	8	11
State	14	24	61	5	10
Education	5	49	29	9	13
Self-employed	5	19	56	8	17
Other	2	22	55	9	13
Not tabulated[3]	14	—	—	—	—

[1]Basis 4,281.
[2]To nearest figure.
[3]Armed forces, students, retired, not classified.

Summary

1. Change is inherent in growth, but change and improvement are not necessarily synonymous. The JOURNAL OF FORESTRY, as the official organ of the profession, must grow and change as the profession grows and changes.

2. The principal characteristic of recent developments in the profession is a widening of the field of interest and of the responsibilities of the average worker.

This is inherent in the great numerical growth and in the swing to greater employment in the field of industry and private forestry.

Furthermore the profession, reaching maturity, is increasingly asked to make wider interpretations of what constitutes a forester's work.

3. Yet the basic bond between foresters is the bond of professional interests, which must be limited by the scientific and technical character of the profession as it is now defined.

4. JOURNAL readers feel that the present departmental emphasis in the magazine is satisfactory but indicate an interest in Forestry News which is considerably greater than the effort presently expended to make that department timely and vital.

5. JOURNAL readers feel that the information carried in the article department is, as a whole, of too highly technical a nature to best serve the average forester.

6. The JOURNAL has a basic responsibility to the Society and the profession which it represents. In order to meet those responsibilities it also has responsibilities to its readers and to its own entity as a magazine.

Conclusions

Expressed reader opinions and a study of developments in the forestry profession indicate a need for broadening the scope of information conveyed in the pages of the JOURNAL. This is interpreted to mean principally that more attention should be given to material which deals with translating technical knowledge into results through workable methods and procedures than to the techniques themselves. This would mean more emphasis on the application of the findings of research; less on the techniques used in securing those findings. It would mean more material dealing with the fields of forest management, utilization, and the business aspects of timber production. It would mean more material dealing with the methods and problems of industrially employed foresters, with the integration of forestry into American business, government, and society, with resource conservation and use in general as a vital human problem.

In any event, however, the JOURNAL must continue to lead in the dissemination of professional information. It is therefore mandatory that any widening of the scope of article subject matter be done judiciously and only on the premise of a similar widening of the field of professional work, responsibilities, and essential interests.

Notes

Evaluating a Cooperative Forest Management Program

A method of measuring tangible progress or results in work such as that carried on under the Cooperative Forest Management Act (previously Norris-Doxey) is difficult to develop. The service (or farm) forester's work is primarily with people, and not only are they difficult of classification but changes of an individual's attitude are even harder to measure and evaluate in relative and definite terms. The following is a method developed by one farm forester to judge the progress of his own work.

An attempt was made to evaluate the work of the farm forester on the Conecuh River Project, with headquarters at Greenville, Alabama, in the summer of 1952. This project had been active since January 1, 1945, with the same forester on the job continuously during that time.

It was desirable to know what changes, if any, were taking place in the landowners' attitudes toward the program; in economic conditions, timber supplies and how they affected the attitudes of the landowners; and to see if any improvement in results of the foresters work had developed.

Methods of Analysis

It was decided that the only way any kind of an analysis of the work of the farm forester could be made was for the forester to do it himself and to rely solely on his written records and memory of each case. It was realized that results thus obtained would have to be evaluated in the light of personal opinions, but on the other hand the forester himself could best judge landowner reaction to the program.

The answers to a number of questions about the represented owners in the records of the forester were desired. Some questions were considered which later were found to be relatively unimportant. Seven categories were finally listed in which to classify each landowner on the the case record list. These categories are shown for the analysis of one counrty in the project area in Table 1.

Table 1.—Classification of Case Records from One County in Conecuh River Farm Forestry Project by Owner's Original Interests, Final Actions, and by Woodlot Condition

Category								
1	2	3	4	5	6	7		
Wanted cruise only	Sought advice on good management (not just a "cruise")	Wanted cruise but were influenced toward better management	Accepted help	Disregarded marking and advice (after accepting)	Helped only to get more money (disregarded marking, nothing to be marked, etc.)	Nothing should be sold	Total new cases	Year
Number								
7	2	6	7	4	8	1	15	1945
15	5	10	12	5	15	10	30	1946
5	2	4	5	2	4	1	9	1947
5	4	6	5	1	4	6	14	1948
1	5	6	7	3	2	2	11	1949
1	6	4	4	1	2	2	8	1950
2	5	1	2	..	1	6	7	1951
Total								
36	29	37	42	16	36	28	94	

One of the main objectives of the study was to determine whether landowners were becoming increasingly conscious of the fact that timber can be managed for increased income in the future. The most important considerations in answering the question were whether owners asked for real advice on how to manage timber properly, and whether they accepted advice to hold onto fast growing timber in face of ready markets. The first five categories of the analysis were designed to give an answer to the questions.

Here are supplementary remarks to explain further each category. The first, "Wanted cruise only," are those landowners who asked for a cruise of all their timber, and wouldn't be persuaded to save any of the fast growing timber. In this group are included those owners who frankly said they didn't want anything else, as well as those who agreed to follow advice, but who later disregarded all advice and help that had been given—by selling all merchantable timber.

The second category, "Sought advice," includes those who proved their sincerity in asking for advice and information by following the advice and help that was given them.

The third category, "Wanted cruise, but were influenced toward better management," includes owners who accepted marking and marketing help, plus those who didn't have anything to sell, but who followed advice in regard to such improved practices as delaying cutting until timber becomes nearer maturity, timber stand improvement work, etc.

The fourth category, "Accepted help," includes mostly those owners who were given help in the woods, in marking and estimating, or marking alone, or (in a few cases) timber stand improvement

work and other cultural practices. A number of these owners hired consulting foresters to do the work. It also includes a few cases where it was advisable to cut to a large minimum diameter, and help in estimating was given by the farm forester or a consultant.

The category, "Disregarded . . . advice" includes those owners who were given help (usually marking and estimating), but who disregarded the advice and marking and sold to a low diameter limit.

The sixth category, "Helped only to get more money," includes the owners who disregarded the markings and advice on timber that had been marked, and also those who sold timber that shouldn't have been cut under any cutting plan, after obtaining contrary advice from the forester. This froup also includes those who were considered to have gained enough information about their timber volumes and values from the forester to enable them to get more money, although it was not the primary purpose of the forester to give such information.

The seventh category, "Nothing should be sold," includes cases where the timber had been cut off in recent years and, from a strict conservation standpoint, nothing should be cut. It is recognized, however, that some of these owners may have needed the money that could have been obtained from selling immature timber.

Each name on the case record list was classified according to the seven categories. In determining proper classification it was necessary for the forester to decide where the owner came nearest to fitting in the classification. It is recognized that this is the critical point in the whole analysis as a fair and objective appraisal of each case had to be made without personal bias.

In order to be listed as a "case," the minimum requirements were that the owner had requested help, the forester had visited him and walked over his woods with him and advised orally, and later had written a letter summarizing the most important points discussed. In reality, the follow-up letter constituted a brief, short term management plan.

After each county was analyzed by the seven category breakdown, the results were combined and analyzed for the project area as a whole. In this study eight separate analyses of all the cases in the project area were made to determine the following:

1. Total number of new cases annually.
2. Percentage wanting cruise only.
3. Percentage wanting cruise, but "converted" to good management.
4. Percentage "converted," plus those who sincerely wanted advice on how to grow timber.
5. Number of new cases given help.
6. Number and percentage of owners who disregarded marking, or large minimum diameter cutting (sold all merchantable timber).
7. Number and percentage of owners who should cut nothing.
8. Number and percentage of owners helped only to get more money (no improvement in forestry practices).

Each table gave totals by counties, for each year, and a summarized figure for all counties in the project area. Table 2 illustrates one of the summarizations.

Conclusions

The complete figures and conclusions of the study made of the Conecuh River Project would require much more space than is available for this paper. However, as an example of the benefits of such analysis, the conclusions drawn from Table 2 are discussed as follows.

It was gratifying to note that the percentage of all owners counted under this combined classification increased from the first year under study until the last. In the first year of work by the forester only a little better than forty percent of all the new cases were persuaded to improve their forest management practices. Later, however, during the last three years of the study, approximately seventy percent of all new owners contacted were influenced to manage their woodlands in an improved manner.

This table also gives some interesting comparisons of the different counties in the project area. (In the six outlying counties only a very few cases were recorded.) Three of the counties—Conecuh, Monroe and Butler—have had a consistently better record than the other two, of the five counties that had been in the project area for seven years. These three counties are more heavily forested than the other two, which helps explain why their owners are more forest-minded than owners in the chiefly agricultural counties. (However, there are a number of other reasons why two of the counties showed a poorer record than the best three, and lack of space does not permit explanations here.)

It is well to point out that figures on one county, alone, may not be as indicative of trends as would figures for all the several counties combined. However, concerning the

Table 2.—Percentage[1] "Converted," Plus Those Who Sincerely Wanted Advice on How to Grow Timber

Year	Butler	Covington	County Conecuh	Crenshaw	Monroe	Six outlying counties	Project Total
			Percent				
1945	45	26	53	38	57	67	43
1946	41	29	50	56	56	16	41
1947	52	37	67	42	83	67	49
1948	63	52	71	44	100	50	60
1949	55	79	91	43	64	83	70
1950	68	50	100	43	58	60	69
1951	80	43	86	50	70	63	70
7-year avg.	57	41	71	44	67	57	

[1]Percentage determined by dividing the number of cases in county under category 2 and 3 of Table 1 by the total number of cases in the county.

figures given as an example for a county analysis (Conecuh), it is interesting to notice the following: The number of new cases "wanting a cruise only," declined almost in regular order from the beginning, while at the same time the number wanting real advice increased slightly. The number of new cases who disregarded advice declined almost in regular order, annually. The number of owners who were only aided in getting more money also declined in almost regular order. The number of new cases who wanted a cruise, but who were converted to better management also declined, but this is partly explained by the fact that there were a number of "repeat" cases in that county. There were a number of cases requiring additional help, in sales of different products and in special management problems.

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The Origin of Epicormic Branches in Fir

A recent article by Cosens (*2*) describes epicormic branching in *Abies concolor* following pruning and relates its incidence to tree characteristics and exposure. The following is by way of a footnote on the origin of such sprouts since Cosens' review states only that the epicormic sprouts in various species "develop from both dormant and adventitious buds."

Büsgen and Münch (*1*) imply the origin of sprouts in *Abies pectinata* by the title of the section, "Dormant buds and epicormic branches," in which they are discussed. Our own observations on *A. balsamea* and *A. concolor* show that the meristems in the axils of many needles commonly persist as minute dormant buds that escape casual notice. The duration of dormancy varies. Some elongate as lateral branches within the first 10 years; others remain quiescent for at least some years after needle fall but appear capable of elongation upon adequate stimulus. Buds of adventitious origin have not been observed. Accordingly, it is very likely that the branching observed by Cosens originated from dormant buds already present on the stems at the time of pruning.

"Adventitious" and "dormant" buds in stems have been somewhat needlessly confused (*4*). Observations thus far suggest that adventitious stem buds are at least uncommon in many native coniferous genera. Like fir, larch and spruce possess dormant axillary buds as Büsgen and Münch note; these are also found in baldcypress. Dormant axillary buds are common in certain pines (*5*) whereas reports of adventitious buds appear to be in error (*6*).

McLintock (*3*) reported increased sprouting after pruning pitch pine and correctly inferred its origin from dormant buds. D. B. Cook has shown the writer similar sprouting in pruned Japanese larch plantations. Aside from the niceties of terminology, the origin of such shoots from dormant buds rather than adventitiously has an obvious significance in determining which species or individuals are capable of sprouting. The presence of buds can be readily determined in advance: No buds; no sprouts!

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A Small Vacuum Treating Plant[1]

Most wood preservatives are applied in commercial plants involving large investments. These are equipped to apply preservatives under conditions of pressure, temperature and vacuum recognized as necessary to assure long service life of the product. In contrast to the thorough preservative treatment given wood in these commercial plants, many manufacturers of wood products treat by dipping or cold soaking. Such treatment is recognized as providing less protection but generally increases the service life of the product.

There is an evident need to fill the gap between the large commercial treating plant and the dip or cold-soak processes with an operation which will provide relatively good treatment at a lower plant investment. The development of such a plant has been an objective of the School of Forestry, University of Minnesota since 1947.[2] The pilot plant constructed and operated at the School's Cloquet Experimental Forest incorporates the principles of the vacuum process in a relatively inexpensive unit.

A general plan of the plant is shown in the accompanying schematic drawing. The treating tank and cover are of arc-welded 12-gauge steel with interior wood framing. The outside dimensions are 4 ft. x 4 ft. x 18 ft. The tank will accommodate 100 3-inch fence posts or 1,000 board feet of lumber per charge. The cover is sealed to the tank by a sponge rubber gasket attached to the contacting flange. Although limited by engineering considerations, change in design and construction would permit some increase in tank size. The electrically driven vacuum pump and the hoist are the only pieces of mechanical operating equipment. The cost of a plant similar to the installation described should not exceed $6,000 at 1952 prices.

For best results wood to be treated should have a moisture content of not over 25 percent. Operation of the treating plant is simple. A treating cycle consists of: (1)

[1]Published as Scientific Journal Series Paper No. 2950 of the Minnesota Agricultural Experiment Station.

[2]Design suggestions from many sources, particularly those from Protection Products Company, Kalamazoo, Michigan, are acknowledged.

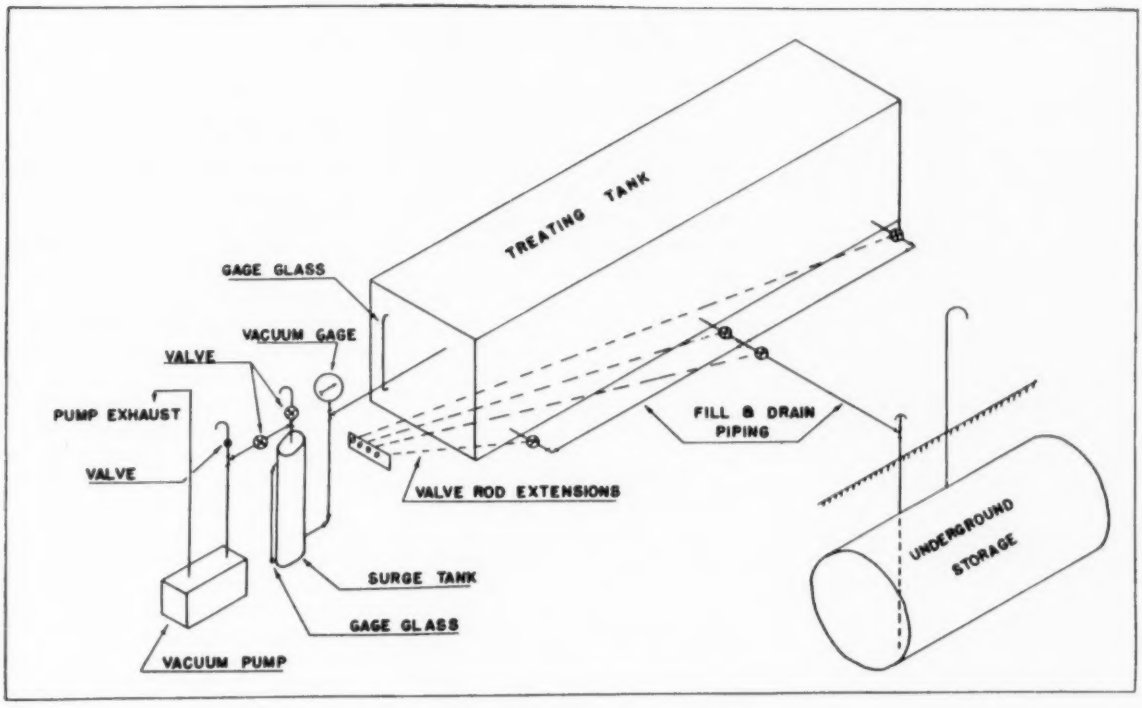

FIG. 1.—Diagramatic Sketch of Treating Plant.

loading the tank and lowering the cover with an overhead chain hoist; (2) drawing the desired vacuum (up to 25 inches of mercury) and holding it for the period necessary to remove air from the wood; (3) while still maintaining the vacuum, allowing the preservative solution to be drawn into the tank from underground storage tanks; (4) releasing the vacuum and if necessary allowing a soaking period; (5) draining the preservative by gravity back to storage; and (6) drawing a final vacuum to remove excess preservative from the treated material. Full sapwood penetration of dry jack pine fence posts has been obtained using a 5 percent solution of pentachlorophenol in No. 2 fuel oil and an operating cycle of less than one hour.

A great deal of added experimentation is needed to fully evaluate the potentialities of such a vacuum treating plant, especially in the preservation of woods more difficult to treat, such as tamarack and Douglas-fir. However, results obtained to date with pine have far exceeded expectations. Small, low cost plants of this type should prove of real value in providing preservative treatment for many wood products now used untreated or inadequately treated.

F. H. KAUFERT, R. L. HOSSFELD, L. W. REES,
School of Forestry, University of Minnesota,
and J. R. NEETZEL,
Lake States Forest Experiment Station, U. S. Forest Service.

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Reviews

The Trees of Long Island.

By George H. Peters. 63 pp. Illus. The Long Island Horticultural Society, Farmingdale, L. I., N. Y. 1952. $1.

The booklet will prove interesting to the layman as well as to the student.

By pointing out the existence of trees on Long Island left over from the past subarctic climate, the reader is shown how the climate is changing and how trees typical of warmer climates are now coming in.

The author enumerates 68 native trees on Long Island. He attributes their existence to the moderate climate and ample rainfall, and explains their distribution in relation to the soil and topographical conditions of the island.

A comprehensive survey and list of the largest trees on Long Island and their specific locations, accompanied by excellent illustrations, are given considerable emphasis.

We are surprised to learn from the manuscript that trees such as the southern magnolia, monkey puzzle tree, deodar cedar, giant sequoia, and the albizzia, ordinarily associated with other parts of the country, are doing well on Long Island.

References to specific specimens of rare and historic values add additional interest. Long Island was the cradle of the oldest commercial nurseries in the country, where new species from all over the world were introduced. The paulownia, the cedar of lebanon, the copper beech, and the lombardy poplar were a few of the introductions.

Reference is also made to the era when large estates were being established on the north shore of Long Island. It was an unusual era, never to be seen again. These estates are now being broken up, but many of the rare collections of trees and shrubs still remain. The owners took personal interest in their places and left a lasting influence on the neighborhood. Mr. Frank Bailey's place, listed in the manuscript, is a fair example. I made his place 39 years ago and I still take care of it. He still loves his place. He is 87 years old and attributes much of his good health and buoyancy to his interest in his estate.

J. J. Levison,
Sea Cliff, L. I., N. Y.

Wood Preservation

By G. M. Hunt and G. A. Garratt. 471 pp. Illus. McGraw-Hill Book Co., Inc., New York. 1953. $7.50.

The contents of this book are contained in twelve chapters, the same number included in the first edition published in 1938. Although new developments and technical data have been included in the revision, the new text has 40 fewer pages than its predecessor. It has, however, 82 more reference citations.

Figures have been brought up to date. At least seven figures have been added and a dozen have been replaced. Thus, new illustrations of yard equipment show diesel-powered units rather than steam-powered equipment; illustrations of fork-lift and straddle trucks have been added. A new figure showing treated blocks undergoing test by the recently developed soil-block method typically illustrates the degree to which the book has been modernized.

Tables have been expanded to show new data. For example, new compounds such as copper naphthenate and copper pentachlorophenate appear in tables listing preservative chemicals; the amounts of principal products treated in the United States for 1951 are given.

New techniques and concepts are presented. The discussion of the painting characteristics of treated wood has been expanded to include wood treated with oil-soluble toxicants as well as with the older creosote and water-soluble salts. The new theory on wood preservation advanced by Finholt, Weeks, and Hathaway appears in the section on preservatives. A section on the gluing characteristics of treated wood has been added.

The book has few shortcomings. Even the price ($7.50) — as textbooks are currently priced — cannot be listed as objectionable. In a few instances members of the lumber industry may object to the system of nomenclature . (Example: sweet gum replaces red gum.) A fence post treating tank made of a 110-gallon oil drum and equipped with a screw-studded false bottom is an impractical suggestion, since it is practically impossible to buy such drums. The screw-studded false bottom is a highly unsatisfactory method of keeping fence posts submerged in a treating solution. These objectionable features, however, are minor and become insignificant when balanced against the good features of the book. The publication is highly recommended to both student and practitioner.

C. S. Walters,
Illinois Agricultural Experiment Station.

Accounting and Cost Controls in the Hardwood Conversion Industry.

By Vincent E. Noltemeyer. 122 pp. Published by the author, 4601 Almond Avenue, Louisville 9, Ky. 1952. $6.

Accounting and Cost Controls in the Hardwood Conversion Industry by Vincent E. Noltemeyer has been published as a result of investigations for the Hardwood Dimension Manufacturers Association, Louisville. He is chairman of their cost accounting committee and is secretary-treasurer of Gamble Brothers, Inc., Louisville.

The book sets up a suggested standard accounting system which would accommodate a medium to

large size concern operating in the hardwood conversion field. Design for original books of entry is suggested together with ledgers and such forms as purchase requisitions, receiving reports, sales orders, and factory instructions. A section describing a method of valuing materials is particularly well illustrated and explained.

Perhaps the most interesting and useful portions of the manual are the sections on control and cost of operations estimating. As developed, these sections are interrelated—present costs serve as a basis of future estimates. The complexity of the problem of estimating conversion costs in manufacturing clear-face products from raw materials containing defects was reduced by the use of experience tables. The detail with which all operations are evaluated and costs determined certainly leads to an appreciation of the accuracy with which costs are estimated.

The book, especially that portion on cost control and estimating, should be invaluable to the trade. It is a recommended reference for the forester—especially for foresters dealing with management or economic utilization as an illustration of the real values of applied lumber grading principles.

James H. Barton,
Tennessee Valley Authority.

Publications of Interest

The Gaylord Container Corporation, Bogalusa, La., has published a booklet, *H. H. Williams—Tree Farmer,* which strikingly tells the story, with pictures and brief captions, of the success of a landowner who grows trees as a crop.

To quote, "Beginning in 1902 with only 60 acres of land, Mr. Williams, through singular vision and courage, has developed his holdings into a 3,300 acre tree farm which is one of the most outstanding in the nation."

It is a good story well told.

* * *

The *Annual Report for 1952* of the American Forest Products Industries, 1816 N St., N.W., Washington 6, D. C., tells of that organization's work in their many fields of activity and outlines results secured and services available.

* * *

The annual report for 1952 of the Weyerhaeuser Timber Company, Tacoma, Wash., tells of their $36 million investment during the year for plant expansion, of their activities in forest products research, and their plans for the future. A very well organized and attractive report.

* * *

Canada's Forests, issued by the Department of Resources and Development, Ottawa, summarizes statistics for that country's forest resources and industries in brief statistical form.

* * *

The National Outlook in Forestry, an address given before the Massachusetts Forest and Park Association by Albert G. Hall, Forest Relations Counsel of Washington, D. C., is available in booklet form.

The booklet summarizes Mr. Hall's considered opinion regarding the development of private initiative and effort in the field of national resource conservation.

A limited number of copies are available from Mr. Hall, 1740 K St., N.W., Washington 6, D. C.

* * *

The film, *Waters of Coweeta,* 16 mm., sound, in color; also black and white, running time 16 minutes, has been released by the Department of Agriculture.

A documentary film showing the results of 20 years of research work at the hydrologic laboratory on the Coweeta Experimental Forest in the Nantahala Mountains of North Carolina; illustrates how the kind of management of our forests affects the flow of water in the streams. Students, teachers, engineers, and scientists visit Coweeta to find out first-hand the results of basic research and applied watershed management. The relation between forests and water is becoming more widely recognized each year as one which affects the lives of all of us in one way or another. Available for loan from regional offices of the Forest Service at Denver, Colo.; Missoula, Mont.; Albuquerque, N. Mex.; Ogden, Utah; Portland, Ore.; San Francisco, Calif.; Milwaukee, Wis.; Atlanta, Ga.; and Philadelphia, Pa.) TV use permitted.

Publication of S. A. F.-C. I. F. Meeting Papers

By mutual agreement technical papers delivered by C. I. F. members at the November joint meeting of Canadian and U. S. foresters will appear in *The Forestry Chronicle* and those by S. A. F. members in the Journal.

Arrangements have been made with the editor of the *Chronicle* to have extra copies printed of the issues carrying meeting papers. These may be purchased at the regular rate of $1 per copy from the editor, Kingsley F. Harris, 3356 West 30th Ave., Vancouver 8, B. C., Canada. Copies of the Journal which carry meeting papers will also be made available for purchase by Canadian foresters.

The March, 1953, issue of *The Chronicle* carries the following papers:

Current Practices and Future Trends in Forest Insect Control—R. E. Balch

Industry Encouragement to Woodlot Management—F. A. Harrison

Logging and Utilization in Spruce-Fir in the West—L. A. de Grace

Sustained Yield Forest Management in British Columbia—C. D. Orchard

Forest Practices on Privately Owned and Privately Operated Public Lands in Canada—A. W. Bentley

Logging and Utilization in Spruce-Fir in the East—R. S. Johnson

Current Literature

Compiled by MARTHA MEELIG, *Librarian, The New York State College of Forestry*

Range Management Section Compiled by FRANCES FLICK, *Library, U. S. Department of Agriculture*

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Protection

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Society Affairs

Officers and Council

1952-1953

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Simpson Logging Company
Shelton, Wash.

ELWOOD L. DEMMON, *Vice President*
Southeastern Forest Experiment Station, Federal Building
Asheville, N. C.

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Washington 6, D. C.

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Kimberly-Clark Corporation
Neenah, Wis.

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Albuquerque, N. M.

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Mobile 9, Ala.

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Bangor, Me.

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1953

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1953

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Seth Jackson, U. S. Forest Service, Washington 25, D. C.

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Hardy L. Shirley, College of Forestry, Syracuse 10, N. Y.

Representative to Natural Resources Council of America

Henry Clepper

Representative to American Institute of Biological Sciences

Henry Clepper

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(As of April 1, 1953. Dates terms began are given.)

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2-27-53

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6-52

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10-13-52

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4. Ohio

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7-1-52

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2. Central Oregon
3. Hawaii
4. Longview
5. Portland
6. Shasta-Cascade
7. Siskiyou
8. Umpqua-Coquille
9. Willamette

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5-23-52

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4. Jackson
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6. Lufkin-Nacogdoches
7. North Louisiana
8. North Mississippi
9. Southeast Texas
10. Southwest Louisiana

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5-52

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Chapters: None

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4-12-52

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2. Southwestern Idaho

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Chapters: None

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2. Black River Valley
3. Capital District
4. Iroquois
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7. Mid-Hudson
8. Ontario
9. Upper Hudson
10. Western New York

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7-1-52

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3. Feather River
4. Lassen-Almanor Forum
5. North Coast Forest Forum
6. Redding
7. Sacramento
8. San Joaquin

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5-1-52

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1-23-53

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Chapters: None

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10-10-52

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2. British Columbia
3. North Olympic
4. Southwest Washington

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2-6-53

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2. Florida
3. Georgia

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7-1-52

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Chapters: None

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7-26-52

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Chapters: None

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11-1-52

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2. Lake Superior
3. North Dakota
4. Northwest Minnesota
5. Southern Minnesota

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5-22-52

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U. S. Forest Service, Washington 25, D. C.

Chapters: None

Wisconsin-Upper Michigan Section
2-20-53

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Forest Products Laboratory, Madison, Wis.

Chapters: 1. Hiawatha
2. Madison
3. Milwaukee
4. Northeastern Wisconsin

Third Call for Council Nominations

All voting members are hereby notified that the regular biennial election will be held December 5, 1953. A president, vice president, and nine other members of the Council will be elected for the two-year term 1954-1955.

The present Council is listed in the box on page 371. Any or all of these incumbents may be renominated, provided they accept the nomination in writing.

President Drake has announced that he will not be a candidate for reelection.

Membership on the Council is restricted by the Constitution to Members (formerly Senior Members) and Fellows. Any Member or Fellow is eligible to hold office who is in good standing and who accepts the nomination in writing and declares his willingness to serve if elected.

Each voter will have an opportunity to ballot on all candidates for office. Council members are elected in accordance with the system of proportional representation. The procedure of proportional representation will be explained in a later issue of the JOURNAL. It is the system by which the Society has been electing Council members for two decades. Candidates for the office of president are voted on separately; the candidate who receives the highest vote is declared elected president, and the candidate who receives the next highest vote is declared elected vice president.

TABLE 1.—DISTRIBUTION OF COUNCIL MEMBERS BY STATES DURING PERIOD 1938-1953
(Presidents' names are in capital letters; vice-presidents', in italics)

State	1938-1939	1940-1941	1942-1943	1944-1945	1946-1947	1948-1949	1950-1951	1952-1953
Alabama			Smith, H. A.					
California	Krueger, M.	Krueger, M.	{ Keen, F. P. { Baker, F. H.	{ Keen, F. P. { Baker, F. H.		Nelson, DeW.	Porter, Earl Nelson, DeW.	Porter, Earl Thompson, P. A.
Colorado		Peck, A. C.	Peck, A. C.			Spencer, J. W.		
Connecticut	Bryant, R. C.[1]	Hawley, R. C.	Hawley, R. C.	Hawley, R. C.				
Dist. of Columbia		*Kotok, F. J.*	Behre, E. C.		Evans, C. F.	McArdle, R. E.	McArdle, R. E.	McArdle, R. E.
Georgia	Kircher, J. C.				*Evenden, J. C.*	*Evans, C. F.*	EVANS, C. F.	
Idaho	Jeffers, D. S.				Coffman, J. D.	Evenden, J. C.		
Illinois								
Iowa	MacDonald, G. B.	MacDonald, G. B.						
Louisiana								
Maine		Eldredge, I. F.	Eldredge, I. F.				Demeritt, D. B.	Demeritt, D. B.
Massachusetts	Cline, A. C.							
Michigan		Allen, S. W.	*Allen, S. W.*	*Allen, S. W.*	ALLEN, S. W.		Fontanna, S. G.	
Minnesota			SCHMITZ, H.	SCHMITZ, H.			Kaufert, F. H.	Kaufert, F. H.
Missouri								Westveld, R. H.
Montana		Gisborne, H.	Gisborne, H.	Smith, G. A.				
New Hampshire					Herr, C. S.	Herr, C. S.	*Herr, C. S.*	
New Mexico							Lindh, C. O.	Lindh, C. O.
New York	*Howard, W. G.*	Howard, W. G.	Howard, W. G.	Recknagel, A. B.	Recknagel, A. B.			
North Carolina	KORSTIAN, C. F.	KORSTIAN, C. F.		Damtoft, W. J.	Damtoft, W. J.			*Demmon, E. L.*
Oregon	Brundage, F. H.				Dunn, P. M.	Dunn, P. M.	Brundage, F. H.	
Pennsylvania	Round, H. F.[2]	McIntyre, A. C.		Shirley, H. L.				
South Carolina						Flory, C. H.		
Tennessee	Baker, W. M.					Baker, W. M.		
Utah								
Washington	Rutledge, R. H.			Greeley, W. B.	{ Greeley, W. B. { *Martin, C. F.*	{ Greeley, W. B. { MARTIN, C. F.	Marckworth, G.	{ DRAKE, G. L. { Marckworth, G.
Wisconsin				Price, J. H.	Price, J. H.			Brown, W. J.

[1] Died February, 1939. [2] Succeeded Bryant, deceased.

How Nominations Are Made

The Constitution (Article VIII, Section 2) states the conditions under which nominations are made by petition.

1. Each petition shall name but one candidate.

2. All candidates must be eligible to hold elective office.

3. A petition shall bear the signatures of at least ten voting members who at the time of signing the petition are eligible to vote in the coming election. (Eligible voting members are Junior Members, Members, and Fellows in good standing.)

4. A voting member may not sign more than one nominating petition for President or more than one nominating petition for a member of the Council. That is, he may sign two, but no more.

5. Petitions must be in the Society office by October 2, 1953.

The Society has no special form for submitting nominating petitions. They may be written as follows:

We, the undersigned voting members of the Society of American Foresters, hereby nominate John Doe, a Member (or Fellow), for the office of president (or member of the Council) for the two-year term 1954-1955.

All nominating petitions should be sent promptly to the Society office. The executive secretary will gladly provide information about nominating or election procedure.

Nominations Received

On the dates this issue went to press the following nominations had been received.

For President: E. L. Demmon, Asheville, N. C. (Vice president, 1952-1953.)

Walter J. Damtoft, Canton, N. C. (Council Member, 1944-1947.)

For the Council: W. C. Hammerle, New Orleans, La.

D. E. Hess, Gettysburg, Pa.

Galen W. Pike, Duluth, Minn.

R. H. Westveld, Columbia, Mo. (Council member, 1952-1953.)

R. Vance Miles, Jr., Tuscaloosa, Ala.

Edwin G. Wiesehuegel, Norris, Tenn.

The Nominating Committee will make no nominations of its own unless the voting membership fails to make the required minimum number of nominations by petition. Voting members should accordingly get busy and make their own nominations. For their information the distribution of Council members by states during the period 1938-1953 is shown in Table 1.

HAROLD B. SHEPARD, *Chairman*,
Nominating Committee.

The President's Column

This month your Council will hold its regular midyear business meeting in Denver. Usually these meetings last two and one-half days, with night work included when necessary.

Our Society is growing to the point where one Council meeting a year is no longer sufficient to transact the necessary business. Although a great deal of business is still carried on by correspondence, even two meetings a year provide barely enough time for the Council to talk over the items that need full discussion prior to arriving at a decision.

The need for full discussion around a conference table has been justified, I think, in reviewing the decisions made at past Council meetings since the war. In practically all cases when actions have been taken involving Society policies, budgets, personnel matters, membership problems, accrediting, and so forth, the members of the Council have acted unanimously, or nearly so. In other words, the Council has not rendered any "split decisions."

Looking back over my term of service on the Council, I see your elected directors acting in two roles, both very important to Society progress. First, the Council acts as a deliberative body, carefully weighing facts, and getting more information when the matter under consideration warrants. Secondly, the Council acts decisively when all the cards are on the table and the chips are down.

As an example of what I mean, take the case of Junior Membership, a touchy issue if there ever was one. Four years ago the Council requested the Committee on Accrediting to make an examination of the schools to determine which curriculums in which institutions contained the minimum professional courses basic to a professional education in forestry, and which therefore would qualify graduates for Junior Membership, the entering professional grade into the Society. (These courses are silviculture, forest management, forest protection, forest economics, and wood utilization.)

When the Committee on Accrediting made its report to the Council, a storm of protest arose. As Myron Krueger succinctly put it, "Suddenly all hell broke loose."

For, it was found, graduates of some curriculums, who heretofore had been admitted to the Junior grade, were no longer eligible. The reason they no longer qualified was because their courses of study did not include silviculture or management or utilization, or any one or more of the five professional courses.

Some forestry school deans and many members protested to the Council, proposing that all graduates of accredited institutions should be admitted to Junior Membership, regardles of what courses they took or failed to take. The situation was further complicated by the fact that some graduates of some schools—for example, wood utilization majors—were eligible for the Junior grade immediately on graduation, whereas other graduates who had taken similar curriculums in other accredited schools were not.

The Council could have taken the easy way out, simply by tabling the report of the Accrediting Committee and maintaining the same membership regulations as in the past. But the Council did not do this.

Instead, the Council decided to let the new regulations ride until Section membership committees, the schools, and the Council itself had ample time to see how they would work. Meanwhile, in 1952 the Council sent a questionnaire to all Sections and Chapters requesting them to take an opinion poll on the controversial issues involved.

As a result of this opinion poll, the Council at its meeting on November 17, 1952 had a pretty good indication of what the members in general thought about the issues. Consequently, the Council was able to propose certain changes in the Constitution and Bylaws that would, presumably, meet with the approval of a majority of the members. Ballots were mailed out, and on March 20 they were counted. By an overwhelming vote, the members approved the amendments.

Briefly, the following matters have been settled.

1. The Council has clear cut authority to approve curriculums as well as accredit schools.

2. Graduates of approved curriculums in accredited schools are eligible for Junior Membership immediately following graduation as in the past.

3. Graduates of accredited schools in certain curriculums not approved for Junior Membership immediately on graduation *are eligible for Affiliate Membership immediately following graduation.* These curriculums are wood utilization, wood technology, wildlife management, and range management.

But keep in mind that this change applies only to those curriculums that do not contain all the five professional courses. When these courses are included in any of the above curriculums in accredited schools, the graduates are eligible for Junior Membership.

4. Graduates of nonaccredited schools are now eligible for the Affiliate grade, immediately following graduation, provided their curriculums contain a specified minimum of the five professional courses previously mentioned. Incidentally, this amendment applies to the Canadian schools.

The fact that the Society could arrive at a sensible solution to a very ticklish problem is, to me, ample proof of the value of full and free discussion in all controversial matters. Even if the solution arrived at still does not satisfy all members, there is no doubt that it satisfies the great majority of members who cast ballots.

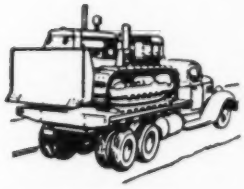
Finally, I believe the results of the referendum, and the way it was handled, show that the Council, while always seeking to maintain high educational and membership standards, is responsive to the wishes of the members when the Council can find out what those wishes are.

This is the way it should be in a democratic organization. In closing, I want to thank all those members, who contributed suggestions and criticisms, for their assistance. I especially thank the Sections and Chapters that responded to last year's opinion poll for their valuable help to the Council. Without that help we might still be groping for the answer.

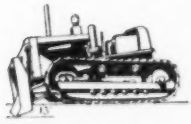
Geo. L. Drake

Now...Improved performance on forestry work with ADVANCED-DESIGN BULLDOZER

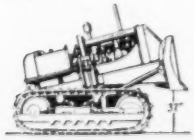
Allis-Chalmers HD-9 Tractor with new 9X *no-push-beam* dozer offers many advantages for building fire lanes and access roads, other forestry jobs. This new bulldozer combination introduces a new narrow-width blade for saving trees and for easier highway transport, as well as new clearance underneath, new-dirt moving ability, new ease of servicing and operation — all at a new low cost. Here's what makes this bulldozer most productive for work in the woods.



• **NARROW BLADE** — only 8 ft. wide — saves trees, makes highway transport easier.



• **BITES DOWN HARD** — Full 13-in. drop below ground, positive down pressure plus steep angle of penetration means fast digging.



• **HIGH LIFT** — Full 37 in. above ground. Excellent for pushing over trees and stumps and clearing brush.

A GREAT NEW TRACTOR. This popular Allis-Chalmers HD-9 Tractor has power, weight and balance that puts it in a class by itself — never such traction . . . such pushing and pulling ability.

A REVOLUTIONARY TEAM. Here is a tractor-dozer combination designed together as a unit, which compares in performance with conventional dozers weighing from five to six thousand pounds more.

NO PUSH-BEAMS. A completely new idea in bulldozer engineering, the 9X blade is mounted directly to the HD-9 main frame. Tractor main frame and dozer are raised and lowered as a single unit.

LIGHTER WEIGHT — BETTER STABILITY. Almost 1,150 lb. lighter than standard dozer. Costs less to buy. And with lighter blade mounted 15 inches closer, tractor center of gravity is not upset. No excess wear on front truck wheels and support rollers.

BIG DIRT MOVER. Because of extra clearance, greatly increased track oscillation and better balance, this team is a phenomenal performer in mud and tough going. And with blade fully six inches higher, capacity is kept on par with conventional blade.

SIMPLIFIED SERVICING. 1,000-hour lubrication of truck wheels, idlers and support rollers. Dozer mounting does not interfere with engine accessibility. No removal of major tractor assemblies. Hinged grill swings out for easy access to dozer hydraulic pump, or to clean radiator core.

EASY TO OPERATE. Just by pulling a single lever, operator can shift from any of the six forward speeds to any of the three high-speed reverses. This, plus narrow, frame-mounted blade makes the HD-9 particularly fast and maneuverable. With no spring deflection, blade responds immediately and positively to control levers.

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K&E Instruments for forest work are made with the same care and precision for which all K&E products have been renowned for 83 years.

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Columbia River Section Honors Radio Stations

Plaques in recognition of outstanding cooperation in fire prevention have been awarded to all Oregon radio stations by the Columbia River Section, S.A.F.

During radio alert week, June 23-29, 1952, these stations devoted much time and effort to the cause of forest protection and conservation. A special committee was appointed by the Section to arrange for suitable recognition. It consisted of George Spaur, State Forester, Larry Jolley, U. S. Forest Service, Arthur Roberts and Arthur Priaulx, West Coast Lumberman's Association, and Albert Wiesendanger of the Keep Oregon Green Association as chairman.

Forty-five plaques, made of pine and attractively finished, were made and donated by the West Coast Lumberman's Association. Each bore a similar citation, as seen in the accompanying illustration, with the call letters of the individual radio station.

Radio station owners and managers were very appreciative of receiving their awards and requested that their thanks be extended to the S.A.F.

This is a fine example of activities being taken by various Sections in recognition of service to the cause of forestry by individuals and groups in their areas.

1952 Winter Meeting Upper Mississippi Valley Section

The annual winter meeting of the Upper Mississippi Valley Section was held at Bemidji, Minnesota on February 13 and 14. Some 130 members and guests attended. A business meeting was held at the Bemidji State Teachers College on February 13, followed by a dinner meeting that evening and a field trip the next day. Highlights of the business meeting were reports on the forestry program of the Iron Range Resources and Rehabilitation Commission; the present status of production and distribution of nursery stock by the Minnesota Forest Service nurseries; the progress being made by the federal Timber Resources Review Project; what is being done by the Keep Minnesota Green Committee; and a paper by Otis Hall of the University of Minnesota School of Forestry on "Where does thinning fit into pulpwood forest management?" New committee chairmen were introduced and each reported on his committee membership and the

program planned for the next biennium.

A motion was carried unanimously that a new committee be set up to work for the direct benefit of the members of the profession. It was the feeling of some members that the forestry profession will not command the respect it deserves until the general well-being of its members — salaries, housing, permanence of tenure—are improved. This will be one goal of the committee; another will be to work toward the employment of foresters in those jobs for which only foresters are qualified.

Galen W. Pike, supervisor of the Superior National Forest, was elected as Section nominee for the Council.

The dinner meeting was enlivened by a male quartet and the awarding of a door prize. This was followed by a talk by Mr. J. Donald Fruen, a member of the Conservation Committee of the Minnesota Efficiency in Government Commission. Mr. Fruen otulined the findings of the Conservation Committee with special reference to the State Conservation Department and presented suggestions for improving the operation of the department.

About 75 members took part in a field trip to see cutting of mature jack pine on state land, cutting in mature balsam, and fence post thinning in young red pine on county land. The latter was of particular interest, illustrating what is now common practice in young stands of jack and red pine in northern Minnesota. The area visited had been covered with overdense red pine. About 70 cords of pine posts and 15 cords of aspen pulpwood were cut from 16 acres leaving a merchantable volume of about 8 cords per acre.

E. I. ROE, *Secretary Treasurer.*

Division of Forest-Wildlife Management Meeting

A meeting of the S.A.F. Division of Forest-Wildlife Management was held March 10 in Washington, D. C. in connection with the 18th North American Wildlife Conference. About 25 members and guests attended. Lloyd W. Swift of the U. S. Forest Service substituted for Ernest F. Swift as chairman *pro tem.*

Henry Clepper, executive secretary, explained the Society's revised membership procedures as they affect wildlife and range management majors who graduate from accredited institutions. Depending on the specific subject matter offered in each school, such graduates are eligible either for the Junior Member or Affiliate Member grade, immediately following graduation.

Arthur B. Meyer, editor, explained the possible improvements in the JOURNAL OF FORESTRY with respect to wildlife articles. Lee E. Yeager, associate editor for wildlife-management, presented statistics to show that of all leading articles published in the JOURNAL during a three-year period 3.2 percent concerned wildlife; 2.7 percent, recreation; and 3.9 percent range management. He urged that more articles on wildlife be submitted, and pointed out that the JOURNAL did not publish more simply because they were not available.

CENTRAL

Yes . . . when large acreages of timber must be sprayed quickly, efficiently and economically, wise timber operators call on **CENTRAL AIRCRAFT.**

So, naturally, when Canada decided to spray more than a million acres of balsam fir this year to kill spruce budworm, the major share of the contract went to **CENTRAL.**

Forest spraying was pioneered in the Pacific Northwest by **CENTRAL,** and for the past eight years **CENTRAL's** seasoned forest pilots and special equipment have shared in nearly every major aerial timber-spraying project in the United States and Canada.

Whether it's insects in mature trees, or a brush-killing problem in young stands, the first choice of fore-sighted timber operators is **CENTRAL.**

CENTRAL AIRCRAFT, Inc.

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Harold W. Steinhoff of Colorado A & M College led a discussion on wildlife management curricula in schools of forestry, and emphasized needs and opportunities in this respect. Participating in the discussion were Warren Chase of the University of Michigan, Fred Cronemiller of the U. S. Forest Service, Henry Mosby of Virginia Polytechnic Institute, and others. It was the consensus of the group that all undergraduate forestry students should be given instruction in wildlife and its relationship to timber, range, and watershed management.

Constitution Amendments Approved by Members

On February 13 there was sent to all voting members of the Society a ballot on six amendments to the Constitution as proposed by the Council at its meeting on November 17, 1952. These proposed amendments, together with certain companion amendments to the Bylaws, were published for the information of the voting membership in the January issue of the JOURNAL, pages 52-57.

March 20 was the final date for returning the ballots. The following results have been certified by a Committee of Tellers consisting of George Kephart, W. B. Sayers, and Walter L. Schipull. All proposed amendments received the necessary two-thirds vote of all ballots cast.

Amendment of Article III, Section 3, defining the grade of Affiliate Member, was approved by vote of 2,460 to 197.

Amendment of Article III, Section 4, defining the grade of Junior Member, was approved by vote of 2,470 to 184.

Amendment of Article IV, Section 1, defining procedure for admissions to membership, was approved by vote of 2,516 to 139.

Amendment of Article IV, Section 2, providing for endorsements of membership applications and advancements in grade, was approved by vote of 2,572 to 80.

Amendment of Article VII, Section 3, defining the duties of the Council, was approved by vote of 2,608 to 48.

Amendment of Article IX, defining the Society's publications and assigning responsibility therefor, was approved by vote of 2,599 to 54.

As these amendments have twice been published, they are not repeated in this issue. A revised printing of the Constitution and Bylaws is now in preparation, and will be sent to all members.

Nominations for Grade of Fellow Now Open

All Members (formerly Senior Members) and Fellows of the Society are hereby advised that nominations for the grade of Fellow are now open. The election of Fellows will be held at the time of the Society's regular biennial election, December 5, 1953.

As defined by the Constitution (Article III, Section 6), "Fellows shall be foresters of outstanding achievement as leaders in responsible directive or distinctive individual work of a fruitful character. They shall be elected from the Members and shall be engaged in forestry work at the time of their election."

Nominations by Petition

The procedure for placing Members in nomination for the grade of Fellow is by petition. The Society has no printed form for this purpose; the petition may be typewritten thus:

We, the undersigned Members and Fellows of the Society of American Foresters, hereby nominate ———— for election to the grade of Fellow in 1953.

EVERGREENS
FOR
FOREST PLANTING OR ORNAMENTALS

For 88 years we have been growers and propagators of evergreen seedlings and transplants, and are in a position to supply you with quality planting stock in small or large amounts, at reasonable prices. Write for complete trade list.

EVERGREEN NURSERY CO.
Established 1864 Sturgeon Bay, Wisconsin

STOP CHIGGER & TICK BITES!
PREVENT DISEASE & INFECTION!

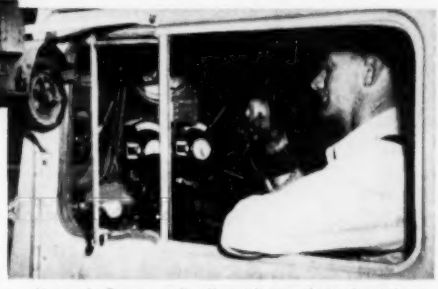
5 Oz. Bomb 98¢
12 Oz. Bomb $1.85

Use Whitmire's
TICKS -OFF
For Sportsmen, Fishermen, Picnickers, Campers and Home

MORE THAN A REPELLENT!
SAFE! FAST! Simply mist on clothing before going into infested areas. Repels Chiggers, Ticks, Flies, Mosquitoes. Guards against Rocky Mountain Spotted Fever, Rabbit Fever, Tick Fever, etc. Used by U. S. Government and State Forestry, Wildlife Depts., etc.

A FEW SECOND SPRAY LASTS ALL DAY!
At Leading Sport, Drug, Hardware Stores
WHITMIRE RESEARCH LABORATORY, ST. LOUIS 10, MO.

2-Way Radio keeps logging machinery on the go!



Motorola 2-way radio dispatches trucks to the right spot in the least time . . . eliminates non-productive mileage and man-hours . . . gives instant 2-way communication in emergencies.

Motorola 2-Way Radio

QUICKLY PAYS FOR ITSELF OVER AND OVER—KEEPS MACHINES AND MEN PRODUCING MORE EACH DAY

ROUGH terrain and weather are no communications barrier to lumbermen! Motorola 2-way radio gets messages through to crews *instantly*, brings lightning-fast control of every situation, gives greatly improved fire protection. With complete co-ordination of all operations, men and machines get more logs out each day . . . increased production pays for Motorola over and over again!

Eight exclusive Motorola improvements guarantee precision selectivity, durability and obsolescence-proof design. Motorola's Uni-Channel dispatcher can be used as a fixed or fully mobile station . . . its Permakay filter eliminates 15 nuisance tuning adjustments. Let a friendly Motorola engineer in your vicinity give you the complete Motorola story. *Write Dept. 2286-JF today.*

Many major timber companies use Motorola 2-way radio to handle loads like these over 12 miles of rugged terrain. Driver of Motorola-equipped truck reports position, permitting other trucks to find turn-outs along one-way road.

Base Station Remote Console controls high-powered transmitter . . . centralizes dispatching . . . co-ordinates logging, forestry and fire-fighting activities. Designed to give years of low-cost, reliable performance, it reaches mobile units over a wide area.

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REFORESTATOR
Mechanical Tree Planter

Manufactured by
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Elsie, Michigan

Remember these simple rules:

1. A petition may not name more than one candidate.

2. It must be signed by 25 Members or Fellows in good standing.

3. It should be accompanied by a factual, not eulogistic, biographical sketch of at least 200 words giving an account of the nominee's professional career and accomplishments.

4. It must be received in the executive office of the Society in Washington, D. C., not later than October 2, 1953.

The executive employees of the Society cannot be responsible for obtaining signatures on partially completed petitions or on petitions incomplete by reason of unacceptable signatures (that is, signatures of other than Members and Fellows in good standing).

Nominations Received

On the date of going to press, the following Members had been nominated for the grade of Fellow:

R. E. McArdle, D. C.
R. R. Reynolds, Ark.
H. O. Cook, Mass.
T. Schantz-Hansen, Minn.

Election Procedure

Fellows are not elected by the membership at large, but by a board of electors which consists of all present Fellows and the present Council. (A Council member who is also a Fellow has but one vote.)

To win election a candidate must receive an affirmative vote of not less than one-half the total votes cast.

Significance of the Grade

The highest membership distinction that can be conferred by the Society, this grade is awarded in recognition of outstanding achievement. Fellows do not pay increased dues; their dues are the same as those of Members.

Since the Society was founded in 1900, there have been 91 Fellows elected. At the present time the number of living Fellows is 62.

Since the last election in December 1951, two Fellows have died: J. W. Girard and Ellwood Wilson.

List of Fellows

The current roster of Fellows follows. The state in which each Fellow is domiciled and the year of his election are shown after his name.

Allen, Shirley W., Michigan, 1948.

Baker, Fred S., California, 1949.
Besley, Fred W., Maryland, 1940.
Brundage, F. H., Oregon, 1949.
Butler, Ovid, Maryland, 1940.

Carter, E., District of Columbia, 1942.
Chapman, H. H., Connecticut, 1922.
Clapp, Earl H., Maryland, 1930.
Clepper, Henry, Virginia, 1949.
Coffman, John D., California, 1946.
Curran, Hugh, Venezuela, 1951.

Damtoft, W. J., North Carolina, 1951.
Dana, S. T., Michigan, 1935.
Demmon, E. L., North Carolina, 1951.

Eldredge, I. F., Louisiana, 1942.
Evans, C. F., Georgia, 1949.

Ferguson, J. A., Pennsylvania, 1949.
Fischer, A. F., California, 1940.
Fritz, Emanuel, California, 1951.
Frothingham, E. H., California, 1942.

Convenient, Easy Way To Remove Bark...

ATLAS "A" DEBARKING COMPOUND

(LIQUID SODIUM ARSENITE)

When treated with Atlas "A" Debarking Compound, the bark of many species of trees becomes permanently loosened. As a result, it can be easily peeled at a convenient time and the wood harvested the year 'round.

This chemical method is used by many leading pulpwood companies and is considered a cheap practical way to debark pulpwood. It is also used in preparing fence posts and poles where bark removal is desired, particularly prior to treating with a wood preservative.

One gallon Atlas "A" Debarking Compound is sufficient to treat 300 to 500 trees. It is quickly applied with a paint brush to a sap-peeled girdle around each tree. Best time to apply is in May or June.

NOW is the time to check on Atlas "A" Debarking Compound!

Photo by N.E. Pulpwood Research Center

Write for Bulletin on Debarking

CHIPMAN CHEMICAL COMPANY, INC.
Dept. 1, Bound Brook, New Jersey

Gill, Tom, District of Columbia, 1948.
Granger, C. M., Maryland, 1946.
Greeley, W. B., Washington, 1918.
Guise, Cedric H., New York, 1951.
Guthrie, John D., Virginia, 1940.
Hall, W. L., Arkansas, 1940.
Hartley, Carl P., Maryland, 1949.
Hawes, A. F., Connecticut, 1939.
Hawley, R. C., Connecticut, 1942.
Heintzleman, B. F., Alaska, 1951.
Holmes, J. S., North Carolina, 1939.
Hosmer, Ralph S., New York, 1932.
Hunt, George M., Wisconsin, 1951.
Illick, J. S., New York, 1946.
Jeffers, D. S., Idaro, 1949.
Kelley, E. W., Montana, 1949.
Kellogg, R. S., Florida, 1949.
Kinney, J. P., District of Columbia, 1942.
Koch, Elers, Montana, 1940.
Korstian, C. F., North Carolina, 1942.
Krueger, Myron, California, 1951.
Lowdermilk, W. C., California, 1948.
MacDonald, G. B., Iowa, 1944.
Marsh, R. E., District of Columbia, 1948.
Martin, Clyde, Washington, 1948.
Mason, D. T., Oregon, 1948.
Morrell, F. W., Virginia, 1951.
Mulford, Walter, California, 1939.
Munger, T. T., Oregon, 1946.
Munns, E. N., California, 1949.
Preston, John F., Maryland, 1948.
Price, Jay F., Wisconsin, 1951.
Schmitz, Henry, Washington, 1940.
Shirley, H. L., New York, 1951.
Show, S. B., California, 1948.
Siecke, E. O., Texas, 1946.
Sparhawk, W. N., New Hampshire, 1946.
Watts, Lyle F., Oregon, 1946.
Winslow, C. P., District of Columbia, 1942.
Wirt, G. H., Pennsylvania, 1948.
Ziegler, E. A., Pennsylvania, 1949.
Zon, Raphael, Minnesota, 1918.

Issue Recommendations for Fire Salvage

Because of the severe fires which occurred during the drought of last fall, the owners of 300,000 acres of burned pine timberland in Louisiana are faced with a salvage operation unparalleled in the history of forestry in the state, according to a special committee set up by the North Louisiana Group, Society of American Foresters. "There is confusion as to how the timber on these lands should be salvaged," the Committee said.

"Considerable variation in the intensity and degree of burns in different stands caused great differences in the amount of damage to the trees. Because of these differences in the degree of damage in different stands of timber it is feared in forestry circles that some stands of timber may be cut too heavily, while other stands may be cut too lightly," the Committee explained.

Therefore, the North Louisiana Group called on The Louisiana Forestry Association to assist in releasing information and recommendations for the guidance of landowners. This survey group was composed of industrial, federal and state foresters.

The committee recommends that wherever possible the landowner secure the advice of a professional forester to assist him with marking his damaged trees for cutting. He can procure such assistance from industrial and public foresters which are available to all small landowners. Owners of forest holdings should obtain the services of private consultant foresters.

COMPLETE INVENTORY CRUISING SCALE

Hypsometer
Biltmore Scale
Rigid When Open
Flexible 6-foot Steel Tape
Handy Chrome-plated Case 1¾" Dia.
$3.00 EACH
IMMEDIATE DELIVERY
CARL W. GETZ, *President*
KURFEW, INC.
Lansdale, Pa.

New McCULLOCH chain saw

POWER! Full 4 brake horsepower. McCulloch saws are rated exclusively by accurate dynamometer.

LIGHT WEIGHT! Only 30 pounds, complete with 14-inch blade and chain.

BALANCED! Center balanced for easy use in all positions—bucking, felling, and limbing.

ANGLE CUTTING! Cuts full power in all positions, all angles, without any adjustments.

The slick, quick tool for one-man woodcutting

McCulloch Motors presents the powerful, smooth Model 4-30 gasoline-powered chain saw. It is a professional-quality saw, with exclusive McCulloch features for fast, all-day sawing in timber up to five feet in diameter.

Manufactured and guaranteed by the world's largest builders of power chain saws; sold and serviced by factory authorized dealers throughout U.S. and Canada.

Costs only $325, f.o.b. Los Angeles.

• **Some other features** — Special McCulloch high-speed Sabertooth chain . . . chrome-plated saber steel blade . . . chrome-plated cylinder wall . . . automatic clutch . . . kick-proof, automatic-rewind starter . . . built-in oiler . . . positive chain tension control . . . grouped engine controls, including starting primer; no choking required.

NATIONWIDE SALES & SERVICE

JOE H. BRADY AND ASSOCIATES

BIRMINGHAM, ALABAMA

Mayo Livingstone, B.S.F., University of Georgia, Manager of the Osmose Treating operation of the Cyrene Turpentine Company, Bainbridge, Georgia.

WOOD TREATING

. . . a plus profit item for lumber producers

At one time, wood treating plants were few and far between. Now, however, more and more lumbermen are discovering the substantial profit that exists in this type of operation. In many instances, people in allied industries have gotten into the business accidentally or to develop markets for their excess timber. Such was the case with Mayo Livingstone of the Cyrene Turpentine Company.

In a recent interview, Mr. Livingstone said, "We went into the Osmose Wood Preserving business because we realized that in our thinning program, much of our wood would be too small for utilization unless some market was developed for small material, for example, fence posts. Consequently, we soon began an intensive investigation of all wood preservatives, and found that the most efficient is the Osmose process.

"Soon after we began operations, the demand for Osmose treated lumber increased in such proportions that it was necessary to maintain our lumber inventory in order to supply the demand. Today, some of the largest industrial plants in this area are constructed of Osmose treated lumber.

"Since establishing the wood preserving division of our firm three years ago, we have expanded our production facilities twice in order to satisfy the demand for Osmose treated products. The future of this type of wood preserving is practically unlimited, and we are now formulating plans for future expansion."

That's the type of report that has been coming in from Osmose Wood Treating plants all over. The demand for treated wood is growing steadily, especially in the South, and every treating plant is working full blast. The Osmose process of wood treating is relatively simple and the initial cost of setting up a plant is quite small, yet lumber people everywhere report that the profit is quite substantial. If you would like full details regarding the establishment and operation of an Osmose Wood Treating Plant and the potential profit in this type of operation, write to John L. Surdam, General Manager and Executive Vice-President, The Osmose Wood Preserving Co. of America, Inc., 980 Ellicott Street, Buffalo, New York.

Adv.

Announcement of Applicants

Applicants for admission, advancement, or reinstatement whose membership applications were received in the Society office during the month of March are listed below.

Action regarding the eligibility of these applicants will be taken by the Council as of June 1, 1953. Any communications from voting members relating to the membership eligibility of any of these applicants should be received in the Society office prior to that date.

WHY CURE?..
PREVENT!
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Allegheny Section

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PENNSYLVANIA STATE COLLEGE
Wiles, F. L.
WEST VIRGINIA UNIVERSITY

Dixon, J. R.
Howard, L. R.
Rinehart, G. G.
Roy, G. K.
Stealey, B. E.
Swatzyan, R. J.
Ulrich, J. A.

Junior Grade

Cranmer, C. B., Forester, N. J. Dept. of Cons. and Dev., Trenton, N. J.; Pa. State, B.S.F., 1930. Reinstatement.

Robertson, R. J., Asst. Dist. Forester, Md. Dept. of Forests and Parks, Salisbury, Md.; N. C. State, B.S.F., 1946. Reinstatement.

Wood, D. L., 508 Haverhill Rd., Pittsburgh, Pa.; State Univ. of N. Y., B.S.F., 1952.

Member Grade

Paulhamus, J. E., Asst. Dist. Forester, Md. Dept. of Forests and Parks, Oakland, Md.; Pa. State, B.S.F., 1942. (Junior, 1945).

Affiliate Grade

Krautter, D. C., Tree Surgeon, Aurora Tree Surgery Co., Roselle, N. J.; Mich. College of Mining and Tech., B.S., (Forestry), 1951.

Appalachian Section

Student Grade

NORTH CAROLINA STATE COLLEGE
Andersen, H. J.

Junior Grade

Edney, R. E., Forester, Southern Box and Lbr. Co., Wilmington, N. C.; Univ. of Ga., B.S.F., 1949; M.F., 1950.

Hasell, T. M., Asst. Dist. Forester, Int. Paper Co., Georgetown, S. C.; N. C. State, B.S.F. 1949.

Stecher, D. A., Grad. Student, N. C. State College, Raleigh, N. C.; Univ. of N. H., B.S., (Forestry), 1950; N. C. State, M.F., 1951.

Member Grade

Frankenfield, H. B., Cons. Forester, Tryon, N. C.; Pa. State, B.S.F., 1939. (Junior, 1946).

Nuite, C. W., Director, Manchester State Forest, Wedgefield, S. C.; Univ. of Ga., B.S.F., 1927. (Junior, 36R46R53).

White, J. R., Dist. Forester, Fairfield Forest Prod. Co., Newberry, S. C.; Univ. of Ga., B.S.F., 1942. (Junior, 1948).

Affiliate Grade

Jeffries, A. R., Forester, Va. Forest Service, Charlottesville, Va.; V.P.I., B.S., (Forestry), 1951.

Central Rocky Mountain Section

Student Grade

COLORADO A & M COLLEGE

Cress, L. M.
Hartsaw, D. R.
Moore, J. E.
Powell, H. D.
Widmer, E. J.
Zimmermann, G. P.

Central States Section

Junior Grade

Thomas, P. D., 326 Walhalla Rd., Columbus, Ohio; Univ. of Wash., B.S.F., 1953. (Student, 1951).

Vollmar, B. F., Water Cons., Dept. of Cons., Lansing, Mich.; Univ. of Mich., B.S.F., 1951; M.F., 1952.

Member Grade

McClintick, K. B., 6143 Guilford Ave., Indianapolis, Ind.; Univ. of Ga., B.S.F., 1940; Duke, M.F., 1941. Reinstatement.

Affiliate Grade

Goodrich, R. L., County Forester, Genesee County Road Comm., Flint, Mich.; Mich. College of Mining and Tech., B.S., (Forestry), 1952.

Wood, L. F., Supt., Ind. Dept. of Cons., Indianapolis, Ind.; Mich. College of Mining and Tech., B.S., (Forestry), 1950.

Columbia River Section

Student Grade

OREGON STATE COLLEGE

Graham, R. L.
Lee, R. F.
Opatz, T. D.
Wetzel, W. W.
Williams, J. C

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Prescott Arkansas

Junior Grade

Maul, T. W., Dist. Warden, Oregon State Board of Forestry, Medford, Oreg.; Oregon State, B.S.F., 1948.

Merritt, J. C., Tbr. Mgmt. Aid, U.S.F.S., Parkdale, Oreg; Oregon State, B.S.F., 1949.

Sorensen, N. P., Engr., M & M Woodworking Co., Albany, Oreg.; Oregon State, B.S.F., 1949.

Van Fleet, D. M., Box 177, Grand Ronde, Oreg.; Univ. of Wash., B.S.F., 1953. (Student, 1951).

Gulf States Section

Student Grade

LOUISIANA STATE UNIVERSITY

Adams, R. J.	McKay, M. K.
Allee, R. S.	Merrill, T. H.
Brister, J. C.	Remel, J.
Marshall, R. B.	Webb, J. S.

Junior Grade

Briscoe, C. B., Instructor, La. State Univ., Baton Rouge, La.; La. State, B.S.F., 1950. Reinstatement.

Henry, J. R., U.S.F.S., Gloster, Miss.; Univ. of Mass., B.S.F., 1949; Yale, M.F., 1953. (Student, 1952).

Holmes, J. L., Supv., Brown Paper Mill Co., Inc., Monroe, La. (Aff., 1950).

Mann, D. E., 503 Ave. E., Bogalusa, La.; Iowa State, B.S.F., 1950. Reinstatement.

Affiliate Grade

Peterson, R. E., Jr., Forester, Kirby Lbr. Corp., Cleveland, Texas; Okla. A & M., B.S. (Forestry), 1953.

Intermountain Section

Student Grade

UTAH STATE AGRICULTURAL COLLEGE

Alfano, S. S.	Hoffmann, J. A.
Christensen, R. C.	Hudson, R. H.
Fenton, R. W.	Johnson, J. H.
Haines, W. H.	Sawyer, R. H.

Junior Grade

Miller, R. J., Forester, Uinta Natl. Forester, Nephi, Utah; Colo. A & M., B.S.F., 1952.

Member Grade

Latimore, R. E., Biologist, Div. of Range and Wildlife Mgmt., Ogden, Utah; Univ. of Wash., B.S.F., 1938. (Junior, 1947).

Kentucky-Tennessee Section

Member Grade

King, R. H., Dist. Forester, Ky. Div. of Forestry, Greenville, Ky.; W. Va. Univ., B.S.F., 1950. (Junior, 1950).

New England Section

Affiliate Grade

Holman, R. L., Party Chief, Int. Paper Co., North Leeds, Me.

Holt, L., Asso. Forester, Pulp and Paper Research Inst. of Canada, Montreal, Canada; Royal College of Forestry, Norway, B.S. (Forestry), 1946.

Jordan, C. M., Forester, Chadbourne Lbr. Co., Bethel, Me.; Univ. of N. H., B.S., (Forestry), 1950.

Marshall, R. H., Scaler, Brown Co., Berlin, N. H.; Univ. of N. H., B.S., (Forestry), 1950.

Perkins, S. H., Forester and Asst. Mgr., Connwood, Inc., Cheshire, Conn.; Univ. of Me., (2 yrs.).

New York Section

Student Grade

STATE UNIVERSITY OF NEW YORK

Bell, C. T.	Wells, O. O.
Young, R. W.	

Junior Grade

Potter, R. W., Forester, Telescope Folding Furniture Co., Granville, N. Y.; Univ. of Me., B.S.F., 1949.

Member Grade

Boone, C. E., Forester, N. Y. State Cons. Dept., Oneonta, N. Y.; State Univ. of N. Y., B.S.F., 1941. (Junior, 1947).

Northern California Section

Student Grade

UNIVERSITY OF CALIFORNIA

Cope, R. H. Gardner, R. W.
Dickinson, C. S.

Member Grade

Brokenshire, W. J., Dist. Rgr., U.S.F.S., Mineral, Calif. Reinstatement.

Affiliate Grade

Clausen, V. H., Jr., Engr., Calif. Redwood Assn., Eureka, Calif.; Univ. of Minn., B.S. (Wood Utilization), 1946; M.S., (Wood Technology), 1950.

Northern Rocky Mountain Section

Student Grade

MONTANA STATE UNIVERSITY

Hearst, A. L. Steiner, R. W.
Johnson, J. W. Stone, G. E.
Smith, E. E. Yarnall, J. L.

Member Grade

Ozark Section

Clymer, C. L., Asst. Ext. Forester, Okla. A & M., Antlers, Okla.; Colo. A & M., B.S.F., 1939. (Junior, 40R48).

Puget Sound Section

Student Grade

UNIVERSITY OF WASHINGTON

Brown, M. M. Schlachter, R. W.
Hanson, R. M. Wilbur, D. W.

Junior Grade

Carlson, J. E., Forester, U.S.F.S., Olympia, Wash.; Univ. of Minn., B.S.F., 1940.

Kidwell, T. V., 404 Cascade, Shelton, Wash.; Univ. of Wash., B.S.F., 1953. (Student, 1952).

McAninch, R. L., Asst. Forester, Simpson Logging Co., Shelton, Wash.; Univ. of Wash., B.S.F., 1951.

Mollett, O. D., 5610 N. 44th St., Tacoma, Wash.; Univ. of Wash., B.S.F., 1953. (Student, 1951).

Sorsdahl, D. H., 210 O St., N. E., Auburn, Wash.; Univ. of Wash., B.S.F., 1952. (Student, 1951).

Thompson, D. W., 4057 Union Bay Lane, Seattle, Wash.; Univ. of Wash., B.S.F., 1952. (Student, 1951).

Southeastern Section

Student Grade

UNIVERSITY OF FLORIDA

Bevis, W. G., Jr. Snell, G. F.

UNIVERSITY OF GEORGIA

Cote, A. J. Richey, J. W.
Holston, G. W., Jr.

Junior Grade

Belcher, H. J., Forest Supv., Rayonier Inc., Fernandina Beach, Fla.; Rutgers Univ., P.S. (Pre-forestry), 1943; Yale, M.F., 1948.

Ramage, J. G., Proj. Forester, Dept. of Cons., State of Ala., Dadeville, Ala.; A.P.I., B.S.F., 1950.

Simons, W. W., Cons. Forester, Coosa River Newsprint Co., Coosa Pines, Ala.; Univ. of Ga., B.S.F., 1950.

Member Grade

Hanson, F. C., Resident Mgr., Hudson Pulp and Paper Corp., Palatka, Fla.; Univ. of Fla., B.S.F., 1946. (Junior, 1947).

Southwestern Section

Junior Grade

Bower, J. S., Forester, Coronado Natl. Forest, Douglas, Ariz.; Colo. A & M., B.S.F., 1935.

Finley, W. B., Forester, U.S.F.S., Glenwood, N. Mex.; Colo. A & M., B.S.F., 1950.

Menninghaus, F. F., Asst. Dist. Rgr., Mayhill Rgr. Sta., Mayhill, N. Mex.; Pa. State, B.S.F., 1949.

Member Grade

Bongberg, J. W., Ent., Forest Insect Lab., Albuquerque, N. Mex.; Univ. of Calif., B.S.F., 1934. (Junior, 1946).

Teuber, R. L., Dist. Rgr., Sycamore Rgr. Dist., Mayer, Ariz.; Iowa State, B.S.F., 1948. (Junior, 1948).

Affiliate Grade

Monighan, F. J., Forest Supv., U.S.F.S., Albuquerque, N. Mex.; Univ. of Ga., (2 yrs.).

Southern California Section

Junior Grade

Rice, B. H., 901 N. Granada Ave., Alhambra, Calif.; Univ. of Calif., B.S.F., 1951.

Upper Mississippi Valley Section

Student Grade

UNIVERSITY OF MINNESOTA

Gilbert, G. W. Magnuson, W. R.
Ferguson, D. D.

Junior Grade

Romanski, E. P., 1052 5th Ave. S., St. Paul, Minn.; Univ. of Minn., B.S.F., 1950.

Winsness, K. E., Research Asst., Univ. of Minn., Div. of Forestry, St. Paul, Minn.; Univ. of Minn., B.S.F., 1949.

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Member Grade

Schaller, M. R., Supt., Dept. of Timberlands, Oliver Mining Div., U. S. Steel Corp., Duluth, Minn.; Univ. of Idaho, B.S.F., 1941. (Junior, 1945).

Affiliate Grade

Jennings, C. G., Pastor, Redeemer Lutheran Church and Our Saviour's Lutheran Church, French Lake, Minn.; Mich. College of Mining and Tech., B.S., (Forestry), 1948.

Wisconsin-Upper Michigan Section

Junior Grade

Berlew, J. G., Research Asst., Dept. of Plant Path., Univ. of Wisconsin, Madison, Wisconsin; Univ. of Toronto, B.S., (Forestry), 1949; Yale, M.F., 1950.

Storer, J. W., Regional Mgr., Osmose Wood Preserving Co., Ironwood, Mich.; Pa. State, B.S.F., 1950.

Affiliate Grade

Corbin, D. L., Forester, Wisconsin Cons. Dept., Antigo, Wisconsin; Mich. College of Mining and Tech., B.S., (Forestry), 1949.

Coming Events

Forest Products Research Society

The seventh annual meeting of the Forest Products Research Society will be held June 15, 16, and 17 in Memphis, Tenn., it has been announced by Kenneth G. Chesley, F.P.R.S. president and director of research at Crossett Lumber Company, Crossett, Ark.

M. S. C. Golden Anniversary

The Golden Anniversary celebration of professional training in forestry at Michigan State College, East Lansing, will be held May 22 and 23.

Central Rocky Mountain Section

A dinner meeting of the Central Rocky Mountain Section will be held jointly with the Council of the Society in Denver, probably on May 22. The Council's mid-year business meeting is tentatively scheduled for Denver late in May.

The Section secretary is Dan Green, 3020 Newton, Denver, Colorado.

S.A.F. Annual Meeting

The Society of American Foresters will hold its annual meeting, with the theme of "Nature on Edge", September 14, 15, and 16, in Colorado Springs.

American Forest Congress

The American Forest Congress of the American Forestry Association will meet in Washington, D. C., October 29, 30 and 31.

What do you think? This is the recommended procedure for pouring SOUTHERN GLO Tree Marking Paint from its new, small-opening can: holding can with opening at top, pour down and across (—but not onto) the top of can. From this position, you may fill a 2-pint gun from the full gallon can easily without spilling paint. The location of the pouring opening at top permits air to enter can uniformly . . . eliminates the glug-glug and sudden spurts of paint that result when you pour holding opening below next to the gun. (*Gun shown is an Eagle.*)

This innovation in standard paint can was suggested by a reader a few months ago, to eliminate for a funnel . . . an extra pack-item for foresters. Since it was published, the idea brought an avalanche of response, with many other reasons for this new type can.

In addition to lightening the load and adding convenience, and presenting a smaller opening to trash that falls into paint and clogs guns, there is the following from New York: "It fits my Scotch inclinations, since I wasted a pint of paint the other day trying to fill a gun when I had no funnel."

—And, from Mr. Paul O. Campbell of S. C., employed by International Paper Company: "At present I open the round cans by cutting a hole in the side. This results in using the full gallon or taking a chance of the partially full can over-turning in my car trunk on the way home." But especially gratifying is the indication of the success of SOUTHERN GLO's new stay-mixed formula #71020 . . . the factor that permits this packaging convenience because the new formula paint does not settle out or require vigorous stirring. Mr. James D. Pond, Pond & Moyer Co., consulting foresters of Ithaca, N. Y., writes of his experience using a gun from which he had neglected to empty SOUTHERN GLO two months before. "It worked perfectly," Mr. Pond reports, "whereas, with ordinary paint it would have required a major cleaning."

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Forestry News

Heintzelman Becomes Governor of Alaska

H. Frank Heintzleman, U. S. Forest Service regional forester of the Alaska Region and representative in Alaska of the Secretary of Agriculture since 1937, became governor of that territory on April 10 following nomination by President Eisenhower and unanimous approval by the Senate on March 16.

Mr. Heintzleman has been actively associated with Alaskan affairs since March 1918 and in many capacities beyond professional work. He received his Bachelor of Forestry degree from the Mont Alto Forest School in Pennsylvania in 1907 and his Masters degree from Yale in 1910. He entered the Forest Service in July 1910 in the Pacific Northwest Region and served there in various capacities until his 1918 transfer to Alaska.

Since that time his career is a story of service to the territory. He wrote the original (in 1921) and several redrafts over the years of the Forest Service bulletin, "The Forests of Southwestern Alaska." He helped draft the long-term timber supply contracts, under which timber from the national forests of Alaska is made available for sawmills, plywood plants, and pulp mills. He conducted negotiations with private companies for the establishment of such enterprises, the largest to date being the recent Ketchikan Pulp Company operation with a plant investment of $46 million of private capital.

Mr. Heintzleman acted as representative of the Federal Commission for southeast Alaska and directed field studies and helped prepare the commission bulletin on the water power resources of that area. He has served on numerous federal and territorial boards and commissions to study Alaska problems. For example, he organized and was first chairman of the Territorial Alaska Planning Board (1939-40) and was co-author of the report "Alaska Planning" issued by the National Resources Planning Board in 1937.

He has also taken an active interest in the development and improvement of community projects, was chairman of the board which solicited funds and erected the $150 thousand Juneau Public Library building, and director of the Southeast Alaska Circulating Library of the Sears Roebuck Foundation.

Frank Heintzleman

Since 1947 Mr. Heintzleman has been active in the affairs of the Pacific Northwest Trade Association, and at the time of assuming the governorship was its vice president for Alaska. This organization, similar to the New England Council, is made up principally of industrialists, and its objective is the economic advancement of the Pacific Northwest states, British Columbia, and Alaska.

Mr. Heintzleman became a member of the S. A. F. in 1915 and a Fellow in 1951.

Resources for the Future, Inc. to Hold National Conference in Fall

A national conference will be held sometime this fall in Washington, D. C., entitled the Midcentury Conference on Resources for the Future, under the sponsorship of Resources for the Future, Inc., Washington. This organization is a non-profit corporation devoted to the support of research and education in the field of resource conservation and development. The corporation has received a grant of $150,000 from the Ford Foundation to prepare for and conduct the conference. President of the corporation is Horace M. Albright, former director of the National Park Service, now chairman of the board of the American Planning and Civic Association.

A council of sponsors, representing various conservation organizations, met in Washington on April 20-22 to consult with the board of directors of Resources for the Future and draft plans for the fall conference.

President Eisenhower has indicated, by letter to Mr. Albright, that he hopes to be present at the conference to welcome the participants and has asked the Interior and Agriculture departments to assist in preparing for the conference.

Budget Cut for Forestry Extension

The revised budget for the fiscal year which begins July 1, 1953, contains no provisions for maintaining positions of leadership and administration at the national level for the forestry program of the Agricultural Extension Service. Two positions, one for the eastern half and the other for the western half of the U. S., have been in existence for years and have been filled by W. K. Williams and A. M. Sowder, respectively.

Highlights of the North American Wildlife Conference

Approximately 1,200 persons, including internationally renowned conservationists, biologists, administrators, and representatives of sportsmen's organizations attended the 18th North American Wildlife Conference in Washington, D. C., from March 9 through 11. Represented in the attendance were people from nearly all the states, provinces of Canada, Alaska, Mexico, and Sweden.

The theme of the conference was "Natural Resources and Human Needs." John A. Hannah, assistant secretary of Defense, presided as chairman of the first general session. He was assisted by Harris Collingwood, analyst in conservation and natural resources, Library of Congress. Authorities who participated in a discussion of the relationship of human populations and available natural resources were Douglas McKay, secretary of the Interior; Kingsley Davis, director of the division of population research, Columbia University; L. G. Hines, head of the department of economics, Dartmouth College; Charles E. Lively, chairman of the department of rural sociology, University of Missouri; and J. G. Harrar, deputy director for agriculture of the Rockefeller Institute.

Dean Hardy L. Shirley of the College of Forestry, Syracuse University, served as chairman of the second general session, and was assisted by Waters S. Davis, president of the National Association of Soil Conservation Districts. Current trends in land and water use were discussed by a

panel, including Dr. Richard E. McArdle, chief, U.S.F.S.

In addition to Mr. Collingwood, Dean Shirley, and Chief McArdle, a number of foresters took part in the conference. Lloyd Swift, U.S.F.S., Henry Clepper, S.A.F., and Director I. T. Bode, Mo. Cons. Comm., represented the profession on the program committee of the conference. J. J. Shomon, of Virginia, served as chairman of the technical session on education and the following S.A.F. members delivered papers at the various technical sessions: H. T. J. Cramer, Wisconsin, William H. Marshall, Minnesota, Starker Leopold, California, D. F. Switzenberg, Michigan, Lee E. Yeager, Colorado, Chester S. Wilson, Minnesota, William W. Huber, Oregon, and Howard E. Weaver, Texas.

Canada to Continue Spruce Budworm Aerial Spraying

According to Central Aircraft Inc., of Yakima, Wash., Canada plans on 1953 aerial spraying operations for spruce budworm that will be the largest ever before undertaken in that country.

Last year, in the Upsalquitch area of New Brunswick, 200,000 acres of balsam fir were sprayed by aircraft. The operation was a marked success, with a kill of "more than 99 percent" reported.

This year's expanded operation will be located in northern New Brunswick where a large and valuable stand of pulpwood timber is threatened by the budworm. The operation is financed jointly by the Dominion government, the Province of New Brunswick, and a group of private timber and pulp firms.

Approximately 15 of the aircraft on the project will be Canadian. Central Aircraft, who furnished most of the aircraft last year, will supply between 55 and 60 for the 1953 operation.

Hicks Elected Pres. Consulting Foresters

At the annual meeting of the Association of Consulting Foresters, held in Washington, D. C., on March 1 and 2, Halsey Hicks of Brattleboro, Vt., was elected president of the association, John Tillinghast of Clothier, W. Va., vice president, and J. Atwood Whitman, Glendon, N. C., assistant vice president. Secretary-treasurer is Edward A. McAllister of Colonial Heights, Va. Speakers at the meeting included Harry Mosebrook, forester with the Natural Resources Department of the U. S. Chamber of Commerce and Dr. Herbert B. McKean, Timber Engineering Company.

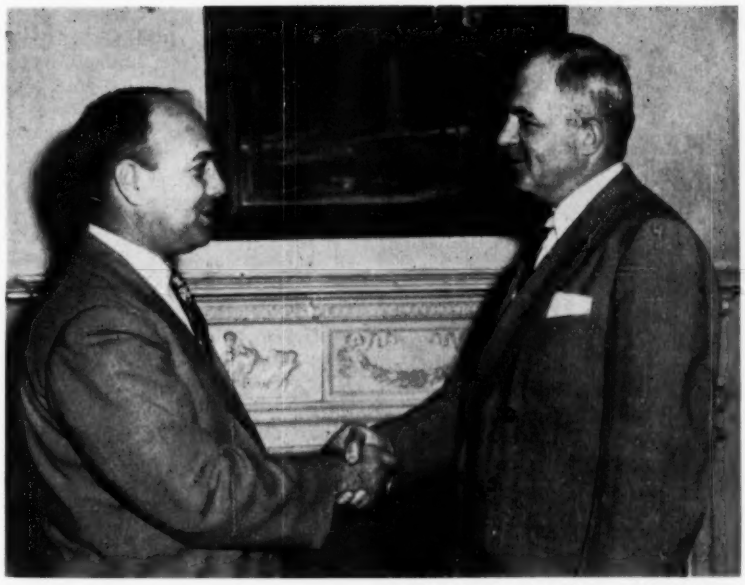

Photo by The American Forestry Association

WITH the Sears-Roebuck Foundation underwriting the annual Conservation Awards of The American Forestry Association for a three-year period, Robert N. Hoskins (left), chairman of the Awards Committee and forester for the Seaboard Air Line Railroad, Norfolk, Virginia, has announced that the scope of the committee's work will be expanded. Mr. Hoskins is shown receiving the congratulations of Fred E. Hornaday, secretary of the A.F.A., on his plans to widely publicize the annual awards which will be made this year at the American Forest Congress called by the A.F.A. October 29-31 in Washington, D. C. Members of Mr. Hoskins' committee are Charles Collingwood, CBS announcer and newscaster; Rep. Watkins M. Abbitt, Washington, D. C.; Dr. Paul Sanders, editor of *Southern Planter Magazine;* Milton M. Bryan, U. S. Forest Service; and Dr. M. B. Mobley, executive secretary of the American Vocational Association.

Industry

N.L.M.A. Calls for Expanded Research

Research on an expanded scale is the next forward step needed by the entire lumber industry, Ralph R. Macartney, president of National Lumber Manufacturers Association, told members of the Western Pine Association at their annual meeting in San Francisco, March 6.

Reporting on 1953 activities, Mr. Macartney emphasized the lumber sales promotion and wood research activities conducted by N.L.M.A.'s affiliated organization, Timber Engineering Company, and cited their work as one of the lumber industry's outstanding examples of how research can pay off for lumber and forest products.

Mr. Macartney pointed out that T.E.C.'s range of projects "runs from review of lumber specifications to railroad cross-ties, and from all wood minesweepers for the Navy to training men for industry."

Mr. Macartney called on lumber manufacturing companies to start research projects in the T.E.C. laboratory in four broad fields: (1) new laminating processes and improved adhesives, equipment and handling machinery; (2) new processes for pulping wood residues from forests, sawmills, and wood products plants; (3) development of treating methods to increase fire resistance and dimensional stabilization and reduce decay and insect damage; and (4) realistic working stress data on the strength of wood and laminated products.

"It is abundantly clear to me, in looking at our competition," Mr. Macartney said, "that improved, superior wood products will hold many markets and develop new ones for the benefit of the public and at a profit to ourselves. That is why I strongly recommend we start thinking now of how we can expand and make better use of our N.L.M.A. research facilities."

Save Your Trees from Old Man Winter

Damage by ice and wind often can be avoided, or the effects lessened by use of correctly designed pruning tools, bracing materials and tree wound dressing.

POLE TREE TRIMMERS No. 1.R. — (compound lever, easy cutting) 6-ft. pole. Other lengths up to 16 ft.

POLE SAW No. 44—(16-inch curve saw cuts freely) 8 ft. Other lengths.

Bartlett Mfg. Co.
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BELSAW ... Over 30 Years in the Development and Manufacture of PORTABLE SAWMILL EQUIPMENT

Thousands of Belsaw Portable Sawmill users throughout the world . . . Belsaw goes right to the trees, thus getting more lumber from all the cut timber. For low cost, high quality production the Belsaw line leads the field. Write today for Free Book, "How To Make Lumber."

BELSAW MACHINERY CO
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3 Patents. Best material. Sold by the thousands.

Infringers and imitators warned.

Best Chrome Steel. Strong. Durable

THE RENOWNED CHARLES H. RICH
"Forest Fire Fighting Tool"
Write for Prices and Descriptions
Geneva Rich Hickel WOOLRICH, PA.

Calder's Forest Road
ENGINEERING TABLES
Ready figured, for professional and axe handle engineers. Great time saver. The condensed experience of 30 years in the woods. Unbeatable for laying out roads. Absolutely weatherproof. Will send on approval (in U. S. only) to foresters and engineers for two weeks trial. Ask for it.
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Fire Danger Rating . . . Weather Instruments
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2806 32nd Ave. S. Seattle 44, Wash.
Telephone RAinier 0356

When writing to advertisers please mention that you saw it in the JOURNAL OF FORESTRY.

Free Film Tells Story of Mahogany

Ideal Pictures Corporation has begun national distribution of *Mahogany —Wood of the Ages* on a free loan basis.

The 16mm sound film, in color, traces the history of the wood from its discovery to today's uses in the home and in industry. Much of the film is devoted to scenes shot in the trackless jungles of Central America, where the great care and time that goes into the selection and felling of the few fine trees deemed suitable for commercial use is presented.

The film may be obtained without charge, except for transportation, from the office of Ideal Pictures, 65 E. South Water St., Chicago 1, Illinois.

Veach Receives Hardwood Award

John B. Veach, president of the Hardwood Corporation of America, Asheville, N. C., was named recipient of the "Hardwood Industry Man of the Year Award" at the president's banquet held in conjunction with the annual convention of the Southern Hardwood Producers, Inc., in New Orleans, February 26 and 27. The plaque of figured red gum was presnted by association President W. M. Hallett, Jr.

This award was established late in 1952 by the Southern Hardwood Producers, Inc., and is given to the person who, in the opinion of the award committee, has made the most valuable contribution to the general welfare of the hardwood industry of the United States.

Mr. Veach is chairman of the board of the National Lumber Manufacturers Association.

Weyerhaeuser Wins Advertising Award

Weyerhaeuser Timber Company was named one of the top winners of the Saturday Review of Literature's first annual awards for distinguished advertising in the public interest.

Competing with more than 200 campaigns, Weyerhaeuser's full-color advertisements depicting Pacific Northwest tree farms won fourth place. These timber company ads have been placed monthly in three nationally circulated magazines for more than a year.

Announcing the awards, the Saturday Review explained: "It is our purpose to recognize, annually, those na-

THE LOWTHER TREE PLANTER PLANTS 10,000 SEEDLINGS EPR DAY!

With the Lowther Tree Planter, trees are properly planted for maximum survival in any soil because they have been given the right start.

Three distinct models available to cover all soil conditions and terrain.

●

For details, write:

THE HARRY A. LOWTHER COMPANY
INDUSTRY AVE., JOLIET, ILL.

By The Makers Of The Famous Lowther C-Saw

Forestry Employment

S.A.F. members are privileged to insert one 60-word advertisement in this column without charge. Forest industries desiring to employ foresters may insert advertisements at the rate of $4 per column inch. Copy must be received by the end of this month for an advertisement to appear in the issue after next.

Obviously, the Society cannot assume responsibility beyond making it possible for prospective employee and employer to enter into negotiations.

Graduate forester, 46, married, immediately available. Employed last eight years in procurement and inspection of poles, piles, ties, and lumber, including appraisal of pole and pile timber, for a wood preservation company. Fourteen years experience in administration, woodland management, and fire protection in state and federal service.

Box A, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester, 24, married, one child, desires relocation in North or Northwest in forestry or related work in wood-producing industry. Experience in cruising, photo mapping, photo interpretation, and reforestation.

Box B, Journal of Forestry, Mills Building, Washington 6, D. C.

Graduating June Purdue University, major forest production, 28, married, two children. Reserve Navy pilot with commercial pilot's license. Five years' business and sales experience. Desire job in forestry or allied field offering opportunity for advancement.

Box C, Journal of Forestry, Mills Building, Washington 6, D. C.

tional advertisements which best serve the public interest, and which most searchingly document the continuing miracle of America."

The Saturday Review's jury was made up of 27 leading educators, editors and publishers, public opinion analysts and advertising executives.

Other top winners were John Hancock Mutual Life Insurance Co., Ford Motor Co., Caterpillar Tractor Co., and Metropolitan Life Insurance Co.

South Carolina Joins Keep Green States

South Carolina in February became the 34th state to join the nationwide Keep Green movement. Ceremonies launching the "Keep South Carolina Green" forest fire prevention program were attended by about 300 forestry, farm, business and civic leaders in Drayton Hall on the University of South Carolina campus in Columbia.

E. E. Dargan, Conway lumberman who is chairman of Keep South Carolina Green, accepted the woods fire problem as a challenge and said, "The people of South Carolina will meet this challenge as they have others in the past."

State Forester Charles H. Flory of the S. C. State Commission of Forestry pointed out that more than 5,600 unlawful fires are started each year, and that over a quarter of a million acres of South Carolina woodlands are burned annually in all fires.

Officials from a dozen statewide organizations endorsed the campaign to reduce the state's forest fire losses. J. E. McCaffrey of Georgetown, chairman of the South Carolina Forest Industries Committee which is sponsoring the movement, presided at the conference.

Miss. Incendiarists Sought

Civic and business leaders of Pearl River County, Miss., have posted a $500 reward for arrest of the person who set a devastating forest fire in their county in February.

Irate citizens held a mass meeting following the three-day blaze that burned out 20,000 acres of forest land in their south Mississippi county. Most of the acreage was owned by Crosby Forest Products Co., Picayune.

As a result of the fire, L. O. Crosby, Jr., has announced that his company "will cease all forestry work in Pearl River County until both laws and sentiment of the people give us adequate protection.

"It would take at least $300,000 just to replant the burned out area," he said. "And the amount of damage to the trees still standing could go into many thousands of dollars."

Mr. Crosby points out that his company operates 11 mobile radios, an airplane and fleets of jeeps to spot and control fires. The company's fire protection payroll is $5,000 a month.

With an operation that draws $4,000,000 in annual sales, the Crosby organization includes a sawmill, pole and piling creosote plant, box factory and veneer mill. Eight hundred Pearl River citizens are on the payroll.

The company owns timberland in five Mississippi counties, and has been reforesting 1,000 acres a year to supplment natural seedling. Its tree planting program was to have been completed in five years.

February fires destroyed practically all of the seedlings planted during the past ten years, Crosby said. "Before we will return to the program of growing tree crops for the future generations of Pearl River, two steps must be taken. There must be a stock law that

FORESTER

Approved for use by U. S. Forest Service

Seal-Tite

DRIP-TORCH

Proved superior in over 6 years of field service

No Flash-back
No fuel slopping
No air pump
No pressure build-up
No explosive vapors
No pre-heating
Instant operation

SAFE • EFFICIENT
RELIABLE • ECONOMICAL

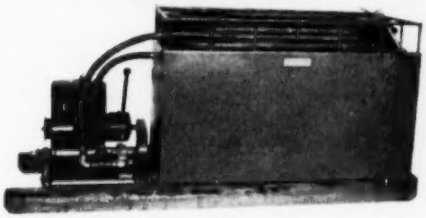
Burns Diesel Fuel or Stove Oil
1¼ Gallon Capacity
Weight loaded 16 pounds

U. S. Patent No. 2378976

Write for descriptive folder and price list.

WESTERN FIRE EQUIPMENT CO.
69 Main St., SAN FRANCISCO, California

PANAMA



This complete PANAMA Slip-on Forest Firefighting pump Unit will fit "within your budget."

It has:

PANAMA Ball Bearing Pump and Compensating By-pass—

3.1 HP B & S Air Cooled Engine *with Clutch*—

120 Gallon capacity tank with inside strainer and Hose Basket around top—

All hose and fittings including 50 ft. ¾" PANAMA 250# pressure Discharge Hose with Pistol Grip cut-off and Combination Nozzle, 3 way valve and 20 ft. 1" PANAMA Suction Hose with strainer (for drafting)—

and is all mounted on skids, connected and ready to go—

Pump Capacity	Free Flow	100# pressure	150# pressure
	15 GPM	12 GPM	8 GPM

The complete Unit can be delivered to any point in the United States for less than $500

PANAMA PUMP COMPANY
HATTIESBURG MISSISSIPPI

The same Unit available, less tank and skids, for those who might want larger or smaller capacity tank or for those who might already have suitable tank.

will prevent open-range grazing, and woods burning must be classified as arson with a mandatory sentence of imprisonment."

Civic leaders who contributed to the reward fund say that they will continue to post $500 rewards for any fires that are set in woodlands of their county. The Picayune Chamber of Commerce has begun an advertising campaign to warn against fire damages and encourage conservation.

Joints A.F.P.I. Staff

Ramon Greenwood, former Little Rock newspaperman, has been named American Forest Products Industries field manager for a five-state region embracing Tennessee, Arkansas, Missouri, Oklahoma and Kansas. Mr. Greenwood's headquarters will be in Memphis where he has offices in the Sterick Building.

Creation of the A.F.P.I. field office in Memphis is intended to increase the effectiveness of the forest industries' educational and informational campaigns in behalf of better woodland protection and wise forestland management in the region.

Niederhoff New President S.P.C.A.

C. H. Niederhoff of the West Virginia Pulp and Paper Company, has been elected president of the Southern Pulpwood Conservation Association. R. V. Miles, Jr., Gulf States Paper Corporation, is vice president.

Government

N. F. Recreation Use Gains in Oregon, Washington

Recreation use of Oregon and Washington's national forests continues to gain, according to figures released by the Pacific Northwest region of the U. S. Forest Service.

More than 3,800,000 recreation visits were made to 19 national forests in the Beaver and Evergreen States during 1952. This compares with an estimated 3,423,000 in 1951, an increase of 10 percent.

A breakdown by activities reveals a 6 percent increase in campground use, a 5 percent increase in picnic area visits, and a 43 percent increase in privately managed resort use.

The only decrease, 19 percent fewer winter sports visitors, is attributed to poor snow conditions in late 1952, rather than a decrease in the number of winter sports enthusiasts.

The Forest Service reports that it finds it difficult to maintain national forest recreation facilities to acceptable standards of public safety and sanitation as most of these facilities were provided during Civilian Conservation Corps days in the 1930's and funds available since have not been sufficient to provide adequate maintenance.

Krauter Named S.C.S. Regional Forester

Orlo W. Krauter has been assigned recently as regional forester for the Pacific Coast Region of the Soil Conservation Service at Portland, Oregon. He replaces Theodore B. Plair who was transferred to the Southeastern Region of the Soil Conservation Service at Spartanburg, South Carolina.

Krauter, a native of Washington, received his B.S. in forestry from the University of Washington in 1926. Then followed seven years of private

Sandvik No. 1
BUSH-AXE
WITH REPLACEABLE BLADE!

- SAFER...
- FASTER...
- EASIER...

THAN AN AXE— FOR BRUSH & SAPLINGS

The thin, flat, razor-sharp blade slices easily through young, resilient stems. Balance and weight for use with one hand. Protected blade cuts closer to ground. Circular and Forester's Tool Catalog is yours on request.

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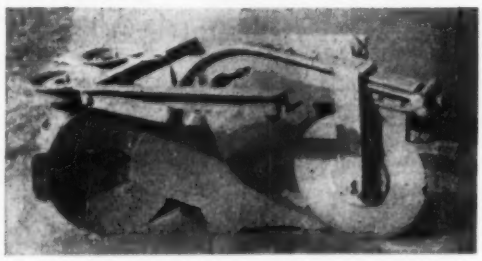


STOP THAT FIRE
RANGER PAL JR. FIRE PLOW

The Ranger Pal Junior fire plow is a hand or hydraulic lift middle buster with coulter and discs. Drawbar connection built of 1" cast steel T beam. Has 16" coulter roller bearing assembly with grease seal, mounted ahead of 11" tempered steel middle ouster, capable of cutting large underground roots. One 16" harrow disc bearing assembly is mounted on each side and slightly behind the middle buster wing which turns the sod over and out. Depth of plowed line may be adjusted by either the presence or absence of two spool weights attached on rear of plow. Leaves a 5 foot earth line and can be drawn by any piece of light equipment, Ford type tractor, Jeep or power wagon. Built compact and sturdy for ease in handling and reduced maintenance costs. Tested and proven by Louisiana Forestry Commission. Made by makers of Ranger Pal Fire Plow. Not designed to supersede the Ranger Pal but adapted for lighter equipment. Mass production price at $385.00 each, f.o.b. shop. Workmanship guaranteed.

Ranger Pal Fire Plow production price at $495.00 each f.o.b. shop. Write for further details on both plows.

TWIN CITY WELDING & MACHINE SHOP
301 Jonesboro Highway
WEST MONROE LOUISIANA

COMPARE THESE OPERATING COSTS

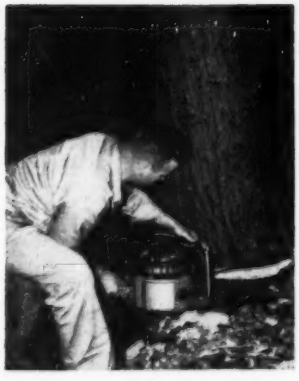
ANTIGO, WISCONSIN

William Wendt is a logging contractor who loans out his saws to men working for him. He has two Homelite Chain Saws and two chain saws of another make. The following figures are for upkeep . . . not the initial cost nor cost for gas and oil...during 1951:

Homelite...2 saws for a nine-month period — $97.00

Other make...2 saws for a three-month period — $576.00

It Pays to Get a HOMELITE One Man CHAIN SAW



Repair bills are a good indication of a chain saw's worth. When repair bills are low it means your saw is on the job. You're not losing production due to down time for repairs.

That's why it pays to buy a Homelite One Man Chain Saw. True, you pay more for it . . . but you get more for your money. You get more production per day because it cuts faster, handles easier. Yes, and you get more days of production because a Homelite is more rugged, more dependable on the job.

For best results, always use the best. Use a Homelite Chain Saw, the saw that's built and backed by a company that has been famous for lightweight, high powered gasoline-engine-driven units for more than thirty years.

Manufacturers of Homelite Carryable Pumps • Generators Blowers • Chain Saws

PERFORMANCE • DEPENDABILITY • SERVICE

HOMELITE CORPORATION

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forestry in Washington's big timber. He was engaged in surveying, cruising, logging, and sawmilling, part of the time as a contractor. After two and a half years as foreman and superintendent in Forest Service C.C.C. Camps, he transferred to the S.C.S. as Assistant Regional E.C.W. Administrator. Later he was a project forester and then area conservationist. For the past 10 years he has been assistant state conservationist of Washington.

Krauter, a member of the S.A.F., has been closely associated with the extensive farm forestry developments in western Washington. He brings to his new assignment a useful combination of experience in both practical forestry and public relations.

Arkansas Forestry and Park Comm. Members

C. F. Byrns, editor of the Fort Smith newspapers, was appointed March 3, 1953, to the State Forestry and Parks Commission to serve with the seven who were appointed February 19th. One additional member remains to be appointed. The Commission roster follows:

W. S. Fox, lumberman, Pine Bluff (chairman)

E. N. Beisel, lumberman, Helena (vice chairman)

Kaneaster Hodges, lawyer, Newport

A. C. Neal, lumberman, Morrilton

Beryl Anthony, lumberman, El Dorado

H. C. Cabe, lumberman, Gurdon

Melvin Dacus, lumberman, West Memphis

C. F. Byrns, editor & publisher, Fort Smith

Seedlings Shipped to Korea from Japan

The shipment to Korea from Japan of 2,100,000 black pine and black larch seedlings, prepared by the Zenrin Welfare Corporation of Koreans living in Japan, has been announced by J. Donald Kingsley, Agent General of the United Nations Korean Reconstruction Agency.

This contribution, made chiefly by Korean residents in Japan with assistance from some Japanese, was offered to the Republic of Korea Ministry of Agriculture and Foreign Ministry through the Tokyo Procurement Office of U.N.K.R.A.

"These seedlings will arrive at the right time of year for planting in the Korean countryside which has suffered heavily from deforestation in recent years," Mr. Kingsley said. "Reforestation on a major scale will play an important part in Korea's agricultural development."

Calif. U.S.F.S. Advisory Council Election

Carl F. Wente, president, Bank of America, San Francisco, and Bestor Robinson, attorney, Oakland, were elected chairman and vice-chairman of the U.S.F.S. Advisory Council for the 1953 calendar year.

The Advisory Council has been serving Regional Forester Clare Hendee and Director S. N. Wycoff of the California Forest and Range Experiment Station since 1948 in national forest administration and research policies and program matters for the California Region of the Forest Service.

The PULL You Can Use In Your Forestry Work

KING

Complete Front-Mount Winch Assembly

Be prepared on your forestry patrol . . . for clearing trails, skidding logs, pulling mobile equipment over rough or swampy terrain . . . with a KING Winch up front on your jeep or truck.

The King Model 100 power-take-off-driven winch assembly, shown at left pulling a log during a North Atlantic Pact military demonstration, gives a powerful 8000-pound pull to your forestry projects.

Lightweight and properly balanced, yet ruggedly braced to handle the toughest pulling jobs, KING Front-Mount Winches have been proved by many similar demonstrations and 21 years operational experience to be capable of tackling the most demanding pulling tasks.

Whether crankshaft driven for 3-speed transmissions or power-take-off driven for 4-speed transmissions, KING Winches are complete "factory fit" assemblies for Willys, Ford, Chevrolet, GMC and some Dodge trucks.

KOENIG ALL-STEEL JEEP CABS FOR EXTRA ALL-WEATHER PROTECTION

Write for bulletins on KING Assemblies to fit your vehicles.

Koenig IRON WORKS

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Kraemer Joins U.N.K.R.A.

Dr. J. Hugo Kraemer has been appointed by the United Nations Korean Reconstruction Agency as advisor to the Republic of Korea on the rehabilitation of forest resources and forestry, U.N.K.R.A. announced recently.

A native of Albany, New York, Dr. Kraemer served since 1951 with the National Production Authority of the United States Government as Chief of the conservation section for lumber and wood products. From 1947 to 1951 he was Associate in Forestry at Purdue University's agricultural experiment station at Lafayette, Indiana. Previously he was with the lumber and paper division of the U. S. Tariff Commission, and was a U. S. State Department attache in forestry to Norway, Denmark, Sweden and Finland.

Dr. Kraemer, a resident of Arlington, Virginia, studied at the New York State College of Forestry and the University of Idaho Forestry School, did graduate work at Harvard University and Michigan State College, and took his doctor's degree at Yale University. He has written three books on woods native to Pacific areas.

Prout Assumes Enlarged S.C.S. Duties

C. T. Prout, Jr., former district conservationist of the Soil Conservation Service in the Mobile River Soil Conservation District, has been assigned to enlarged duties as forestry specialist for forestry planning work in soil conservation districts in the southern half of Alabama.

A graduate of the North Carolina State School of Forestry, Mr. Prout has served in various forestry and administrative positions with the Soil Conservation Service in North Carolina, Georgia, and Alabama since 1935. He was in the Marine Corps during World War II and served 14 months in the Pacific area.

Mr. Prout is a member of the S.A.F. and is president of the Mobile group of the Southern Section of the Society. He is also a member of the Alabama Forestry Council. His headquarters will remain in Mobile.

Allied

Gabrielson Awarded 1953 Leopold Medal

Dr. Ira N. Gabrielson was presented the Aldo Leopold Medal by the Wildlife Society at the annual banquet of the North American Wildlife Conference in Washington, D. C., on March 10.

Dr. Gabrielson first entered wildlife work in 1915 when he was employed as a biologist in the Bureau of Biological Survey. For the next 20 years he was assigned by that agency to many projects, chiefly in the western states where he became widely recognized as an authority on birds, mammals and other resources.

In 1935 he became chief of the bureau following the retirement of "Ding" Darling.

During Dr. Gabrielson's tenure, first as chief of the Biological Survey and then as director of the Fish and Wildlife Service, he nurtured the newly organized Cooperative Wildlife Research Unit Program and fostered the development of national wildlife refuges. The Pittman-Robertson program was also initiated during his directorship.

In 1946 he became the first president of the Wildlife Management Institute and in that capacity has continued to work for the improved administration, management and restoration of renewable natural resources at state, federal and international levels.

Dr. Gabrielson is author or co-author of five full length books and hundreds of scientific papers and popular articles on ornithology and wildlife conservation. He has served as chairman of the American delegates to the International Whaling Convention and the International Union for the Protection

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New illustrated catalog contains hundreds of practical items to help you in your work. Satisfied customers all over America.

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RxB* *IS PRESCRIBED BURNING*
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Why do Jerseymen prefer the
CRANCO TORCH?
Write:
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**RxB is the trade mark of the CRANCO COMPANY, furthering sound forestry practice through the intelligent use of fire in forest management.*

SEEDS FOR NURSERYMEN
TREE — SHRUB — PERENNIAL —
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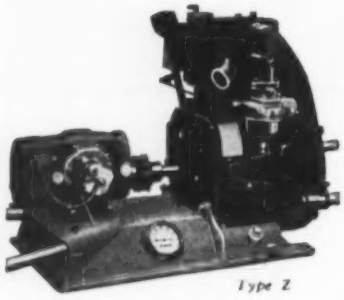
Correspondence with Seed Collectors Invited
HERBST BROTHERS
Established 1876
678 Broadway New York 12, N. Y.

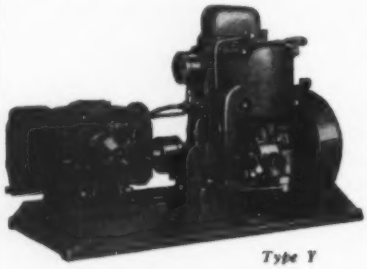
"Almost 30 Years Old and Still Going Strong"

That's what owners report about some of earliest models of Pacific Pumpers ever built.



Type Z

WHEN THE FIRST Pacific Pumper was introduced, it was a startling innovation. To produce an efficient pump light enough to carry by hand into rugged terrain but powerful enough to deliver an effective flow of water to combat forest blazes was news of national importance. Today, after nearly 30 years, many of the earliest Pacific Pumpers are still in use and are still the favorite of experienced fire fighters . . . mute testimony to the stamina and dependability built into all Pacific Pumpers . . . and to Pacific Pumper's policy of supplying parts for even the earliest models.



Type Y

Years of engineering research and thousands of practical field tests made possible the improvements incorporated in the famous Type Y Pacific Pumper . . . the most powerful unit ever built for its weight and size. The Type Y Pacific Pumper quickly won the approval of experienced fire fighters and fire fighting authorities . . . and is still the standby of many of the nation's most practical forest fire fighters. Newer, post-war models of Pacific Pumper are now available . . . all even lighter, more compact and durable and more versatile for a variety of purposes.

Write for data on the complete line of Pacific Pumpers, Pacolized hose and accessories.

PACIFIC *Marine Supply Co.*
FIRE EQUIPMENT DIVISION
SEATTLE 1, WASHINGTON

of Nature and was only recently elected chairman of the Natural Resources Information Committee.

Sierra Club Sponsors Wilderness Conference

The third biennial Wilderness Conference, sponsored by the Sierra Club, will be held Friday and Saturday, May 15 and 16, at the Hotel Claremont in Berkeley, Calif.

Main topics of discussion will be how to maintain and strengthen the idea of wilderness protection; how to improve existing wilderness areas; and the protection of some of the wilderness of arctic Alaska.

Surveying and Mapping Congress Held

The American Congress on Surveying and Mapping held its 13th annual meeting in Washington, D. C., March 23-25. Approximately 1,000 members and guests were in attendence. The congress is composed of representative of federal, state, and local governments, educational institutions, manufacturers of equipment, engineering firms, students and representatives from other countries in the Western Hemisphere. A wide variety of subjects relating to surveying and mapping were discussed by prominent authorities.

Education

Pennsylvania Offers Short Course

A short course in hardwood lumber grading and inspection is being offered by Pennsylvania State College, Department of Forestry, and is open to all interested persons June 8-12. A member of the National Hardwood Lumber Association will assist in the instructional work of the course which will consist of: (1) interpretation of the hardwood rules; (2) general inspection instructions; (3) considerations of miscut, thickness, lengths, measurement and tally of lumber; (4) clear face and sound cuttings; (5) standard defects; (6) methods in applying the rules; (7) exceptions to standard grades, and; (8) several days of actual practices at nearby mills.

Emphasis will be on local Pennsylvania hardwoods.

Advance registration is required and the course fee of $25.00 must be mailed with the application. An out-of-state instructional fee of $5.00 per week is also charged those who are not residents of Pennsylvania. Enrollment is limited to 30 persons, and the course will not be given unless 20 or more have registered.

The first part of the course will be to acquaint the student with the use of lumber grading rules, and will be conducted in the Forestry building on the main campus. The phase of practice grading will be done at the college sawmill and other mills in the adjacent area.

In the event that any persons are interested in more details on the course they can obtain the desired information by writing to:

The Pennsylvania State College, Department of Forestry; Attention: Orvel A. Schmidt, State College, Pennsylvania.

Golden Year of Forestry Marked at Michigan State

Fifty years of Forestry Department history and service will be observed at Michigan State College with a special campus program on Friday, May 22, and tours of area forests on Saturday, May 23.

Forestry and nursery areas of interest to visitors will include the Bogue Forest Nursery, named in honor of E. E. Bogue, first M.S.C. forestry department head; the Beal Pinetum established in 1896 by Dr. W. J. Beal, professor of botany and forestry; the Toumey Virgin Woodlot and the Rose Lake Wildlife Experiment Station. All are on or near the campus at East Lansing.

A day-long tour is planned Saturday to the Kellogg Forest near Battle Creek to see plantings, thinnings, hybrid poplar plots and other points of interest, with luncheon to be served in the field.

Hydrologic installations, forest products and wood utilization laboratories and the college sawmill will be other points of interest. The M.S.C. foresters operate nurseries producing about 12,000,000 seedling trees a year for use by farmers and others in statewide plantings.

Taught first as a botany course—with records of forestry lectures as far back as 1882 at the old Michigan Agricultural College, M.S.C.'s former name—forestry was set up as a separate department in 1903. In 1950, M.S.C. set up the Conservation Division, including forestry, fisheries and wildlife, forest products, and land and water conservation as four separate departments.

Major forest projects, in addition to the above, include the Dunbar Forest Experiment Station near Sault Ste. Marie in Michigan's Upper Peninsula and the Russ Forest near Dowagiac in southwest Michigan.

Golden anniversary registration will start at 8 a.m. May 22 at the Forestry Building, where the Forestry Alumni association will meet at 10 a.m. the same day. Presiding as alumni president will be Durward Robson, '23, chief of the Field Administration Division, Michigan Department of Conservation.

Buffet luncheon will be served May 22 in the A. K. Chittenden Memorial Forestry Cabin, on the Red Cedar River. The cabin was dedicated to honor Mr. Chittenden, former head of forestry.

In a general meeting from 2 to 4:30 p.m. May 22 in the Music Auditorium, guests will be welcomed by Dr. Clifford M. Hardin, director of Michigan Agricultural Experiment Station and dean-designate of agriculture. Dr. Paul A. Herbert, director of the Conservation Division, will discuss "The Past, Present and Future" and Dean George A. Garratt of Yale University School of Forestry, a 1920 M.S.C. graduate, will talk on "Education and Research in Forestry."

Dr. T. D. Stevens, head of the forestry department, will be the toastmaster at a banquet at 6 p.m. May 22 in the M.S.C. Union. Speakers will include Governor G. Mennen Williams, Alumni President Robson and Earl W. Tinker, class of 1913, now executive secretary of American Pulp and Paper association, New York City. Tinker formerly had charge of all cooperative programs in state and private forestry work for the U. S. Forest Service.

Guests taking the half-day campus and nearby area trips Saturday will have luncheon at the Union and attend the Wisconsin-M.C.S. baseball game that afternoon.

S. C. Holds Sawmill School

A sawmill training school sponsored by the S. C. State Commission of Forestry was recently held. District foresters and other technical foresters of the commission, as well as U. S. Forest Service and Extension Service foresters attended the training school. The main part of the training was conducted by C. J. Telford of the Forest Products Laboratory. G. H. Englerth of the Southeastern Forest Experiment Station, T. A. McClay of the Santee Experimental Forest, and State Forester C. H. Flory were also on the program of the school.

O'Neil to Head N.Y. Pulp and Paper Course

Prof. Frederic W. O'Neil has been named head of the department of pulp and paper technology at State University of New York College of Forestry at Syracuse. His appointment was effective March 1.

O'Neil succeeds Prof. C. Earl Libby, who retired last July after 32 years' service to the college, the last 20 as department head. Prof. Libby now heads a new curriculum in pulp and paper technology at the School of Forestry, North Carolina State College of Agriculture and Engineering of the University of North Carolina at Raleigh.

Gordon M. Moulds of McMasterville, Que., has been appointed instructor in pulp and paper technology at the college. He will assume his new duties April 1.

A native of Yonkers, N. Y., Prof. O'Neil received his B.S. in 1933 and M.S. in 1935 from the College of Forestry at Syracuse. He was with the research department of Hooker Electrochemical Co., Niagara Falls, N. Y., for two years before joining the college faculty as an instructor in 1937. The new department head was promoted to assistant professor in 1943, associate professor in 1945, and professor in 1951. He has been acting

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department head since Prof. Libby's retirement.

Moulds received his B.Sc. from McGill University, Montreal, in 1948. He is now a candidate for a Ph.D. degree in McGill's Division of Industrial and Cellulose Chemistry. For the past four summers, Moulds has worked on organic syntheses at the Central Research Laboratory of Canadian Industries Ltd., McMasterville.

N.Y. Ranger School Graduates 45

Forty-five youths were graduated February 18 from the State Ranger School at Wanakena (N.Y.) at exercises held at State University of New York College of Forestry, Syracuse. The Ranger School, now in its 41st year, is a division of the forestry college.

"A Time To Fight" was the commencement address topic of Dr. Charles C. Noble, dean of Hendricks Memorial Chapel, Syracuse University. Prof. Floyd E. Carlson of the forestry college gave the invocation and Dean Hardy L. Shirley welcomed the '53 class and their guests. Certificates were presented by Dr. Shirley and Prof. James F. Dubuar, Ranger School director for the past 33 years. The program closed with a message from Mr. Dubuar on "Your Responsibilities."

This class makes a total of 1,075 graduated from the school since its 1912 founding. This year's graduates came from 31 New York communities, New Jersey, Massachusetts, Connecticut, and Rhode Island.

Established in 1912, the Ranger School is located within a 2,330-acre forest on Cranberry Lake outlet in the Adirondack Mountains. It is the oldest and one of only three such schools in the United States.

L.S.U. to Publish Forestry Notes

The School of Forestry at Louisiana State University has inaugurated a new series of technical papers. No definite publication dates will be set for the "LSU Forestry Notes", rather it is planned to distribute research information as it develops. The notes will consist, in the main, of progress reports on current research being conducted by faculty and staff members connected with the University and with the Louisiana Agricultural Experiment Station.

In order that an accurate and live mailing list may be developed and maintained, it is requested that individuals or organizations interested in receiving issues of this publication will so indicate in a letter or card addressed to LSU FORESTRY NOTES, School of Forestry, Louisiana State University, University Station, Baton Rouge 3, Louisiana.

Soil and Nursery Research Initiated at Auburn

Forest tree nurserymen may now get four standard tests on nursery soils by sending samples to the Forestry Department, Alabama Polytechnic Institute, Auburn, Alabama. The tests now offered include pH, available phosphorus, available potash and replaceable calcium. Plans are being made to add tests for organic matter, base exchange, replaceable magnesium and possibly total nitrogen by 1954. Requests for sampling instructions, data sheets, shipping cartons and information on costs should be directed to W. B. DeVall, Head, Forestry Department.

The soil testing service is being offerred as one of the early phases of a nursery management research program. Fundamental studies now underway at the Auburn Nursery are designed to evaluate various management techniques that may increase the number of plantable seedlings produced on the present nursery acreage. This work has been initiated with the assistance of the Alabama Forest Industries through the Alabama Forest Products Association. By coordinating the soil testing program with the nursery management program, new soil management techniques can be adequately tested and compared under standardized conditions. New techniques or practices developed at the Auburn Nursery will be tested at the other Alabama forest tree nurseries where soil types vary.

Techniques successful in Alabama may be of value to nursery and planting personnel in other states. Since research of this type is expensive and nursery managers seldom have time to devote to strictly experimental studies, it is anticipated that other states and private industries would be willing to support or sponsor an expanded program, regional in scope. Current information and recommendations would become available without having to wait for published results. Considerable interest in this proposal has been expressed by foresters and others who find themselves confronted with the same nursery problems year after year.

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